

# The Dental Digest.

Vol. IV.

CHICAGO, NOVEMBER, 1898.

No. 11.

## Original Contributions.

### PORCELAIN CROWN.

By H. H. SCHUEHMANN, M.D., D.D.S., CHICAGO.

Recently I had occasion to make a crown for one of my patients, which although a bad case turned out so satisfactorily that I, in giving others the benefit of the *modus operandi*. The idea may not be an entirely new one, but it was new to me, and was the result of efforts to overcome difficulties I had not had occasion to obviate before.

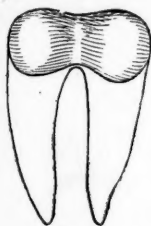


Fig. 1.

The tooth was a lower right first molar, with root-canals almost filled with pulp-stones. The crown of the tooth had been cut down to the neck, so that none of the tooth structure protruded beyond the gum line. The periodontal membrane came almost to the surface, causing the neck of the tooth to be hypersensitive. The gingival margin along the buccal surface had contracted so as to show very plainly the bifurcation of the roots, and the lingual side of the neck was almost in the same condition, while the gums over both anterior and posterior roots had receded still more, so that the surface presented was convex. Fig. 1.

The periodontal membrane coming up close to the surface as it did, together with the hypersensitive condition of the patient generally, precluded the possibility of making a band. (The patient suffered from severe organic heart trouble, which prohibited the use of cocain.)



Fig. 3.

Two holes were drilled, one into each root about three-sixteenths of an inch deep, and 16-gauge round iridio-platinum wire posts were fitted into these, protruding from the tooth one-quarter of an inch. The holes in the roots were not made deeper for fear of drilling through the side. Fig. 2.

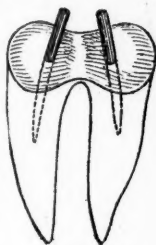


Fig. 2.

The next proceeding was to cut out the pulp-chamber into a deep

saucer shape. An impression of this cavity was taken in gutta-percha, and with Watts' metal a pure gold lining 32-gauge for it was struck up. Fig. 3. This lining was placed in the pulp-chamber and burnished, the iridio-platinum pins thrust through it, which owing to the divergence of the roots almost crossed each other and had to be bent up straight and parallel, Fig. 4 A.

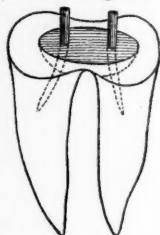


Fig. 4 A.

A wax impression was taken and the whole was invested in marble dust and plaster, the wax removed and the inlay filled up with 22 k. gold, producing a solid and exactly-fitting gold inlay, with two iridio-platinum pins protruding through it, both above and below. Fig. 4 B.



Fig. 4 B.

The next step was to swedge an iridio-platinum covering for the root, which after being properly fitted was perforated with two holes, allowing the inlay and pins to be placed in the tooth, and the iridio-platinum covering to be put down over it.

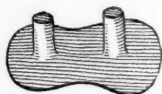


Fig. 5.

Now two platinum barrels were made with one

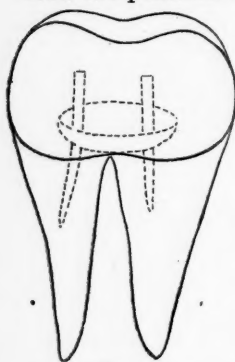


Fig. 6.

end closed to fit down over the posts, all the parts were put in position, a gutta-percha impression taken, and the entire appliance removed to the laboratory, where the platinum barrels were soldered to the iridio-platinum covering, Fig. 5. The work then consisted of two pieces—one the gold inlay with the two iridio-platinum pins, and the other the small iridio-platinum plate with the two platinum barrels soldered to it; this latter piece was now used as a base to make an all-porcelain crown with the platinum barrels imbedded in it. The soldering

of the barrels and tooth facing to the iridio-platinum base was done with 30 per cent platinum solder. The inlay with its posts was cemented into the roots and pulp-chamber, and when the cement set proved to be very secure indeed. Next the crown was put down over the protruding pins and cemented into place. Fig. 6.

The operation required considerable time and patience, but the result is a crown of excellent lasting qualities, great comfort and beautiful appearance, and I know of no other way in which I would have been able to save the roots of the tooth.

### PRESIDENT'S ADDRESS.

BY G. N. BEEMER, D.D.S., MASON CITY, IOWA. READ BEFORE THE NORTHERN IOWA DENTAL SOCIETY, JULY 5-8, 1898.

One day a ragged, barefooted colored boy, with a tattered straw hat on his woolly head and a broad grin on his ebony face, was dragging by a string an old soap-box filled with tin cans and other rubbish. He seemed so happy that a lady stopped and said to him, "Well, my little man, you seem to be having a fine time. How old are you?" Rolling his eyes up at her, he replied, "Mammy says I'se seben, but judgin' from the fun I'se had I'se at least sebenty." So it is with our society: though only four years old, yet judging from the pleasure which has been derived by those who have attended the meetings, it is much older than the years indicate.

The existence of this society is due to Drs. Steele, Grout and Belding, who realized when only six dentists from Northern Iowa were present at the state meeting that another society was needed. Each year has seen new members added and this session promises an even greater addition to our ranks. As the founders of this society in organizing it showed their devotion to the profession, let us follow their lead in our society work. If we have any theory or method which will enable our fellow practitioners to give better service to their patients, let us impart that knowledge.

Dentistry has risen from a trade carried on by a carpenter, blacksmith or barber, to one of the noblest professions. At a banquet given by a dental society one speaker was assigned the toast, "The Dignity and Utility of Our Profession," and this was his response: "Suppose that to-morrow in every business, profession, political or social sphere, all who have false teeth of any number or kind should appear without them. Suppose that to-night all the fillings in teeth should drop out and each pulp be exposed to hot and cold, sweet or sour. Then and then only could we measure the utility or conceive the dignity of our profession."

A dentist gave anesthesia to the world and thus made possible the painless performance of surgical operations. The blessing of

this is beautifully expressed in the following words of Dr. Oliver Wendell Holmes: "The knife is searching for disease, the pulleys are dragging back dislocated limbs, nature herself is working out the primal cause which doomed the tenderest of her creatures to the sharpest of her trials, but the fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed forever."

The science of dentistry has been of inestimable value to the community, both as regards the alleviation of suffering, the perfecting of new appliances, and the enactment of laws for the protection of laymen as well as dentists. Let us as a society do our part towards helping on the general work, as well as making our organization a success.

---

### THE ESSENTIAL OILS AND SOME OTHER AGENTS: THEIR ANTISEPTIC VALUE; ALSO THEIR IRRITATING OR NON-IRRITATING PROPERTIES.

BY A. H. PECK, M.D., D.D.S., CHICAGO. READ BEFORE THE NORTHERN IOWA DENTAL SOCIETY, JULY 5-8, 1898.

Very soon after assuming the duties of the chair of materia medica and therapeutics in college work I became convinced that in our literature there was much loose statement concerning the action of the drugs we employ in dentistry. Especially did this seem true in regard to the antiseptic powers of the various agents employed as such. Further, the therapeutic action of these agents has generally not been especially considered. It seems that iodoform is still used by many as an antiseptic, though it has long been known that it has not this power. Also, that the presence of albumin renders the ordinary solutions of bichlorid of mercury inert as to antiseptic power, and prevents the effectiveness of that agent in treating suppurative surfaces, yet it is persistently used for this purpose. Also, the essential oils, some of which have previously been shown to possess antiseptic virtues, have been looked upon as a group of antiseptics, and, as it has seemed to me, are being used without reference to their relative merits as antiseptics, or to their therapeutic effects upon the tissues to which they are applied. For these reasons I have in my teaching in the Northwestern University Dental School made trial of these agents in the bacteriological laboratory concerning their effectiveness as antiseptics, and have

also in various ways proved their effects upon the animal tissues, in order that I might speak definitely of my own knowledge of these matters. In this paper I will give briefly my observations upon a number of these agents.

To determine the antiseptic value of these agents the following experiments were conducted: Test tubes, each containing ten c. c. of sterilized mutton bouillon (which amount will hereafter be referred to as the *unit of culture media*) were used. The broth in these tubes was for the most part infected with saliva from various members of the class. In each set of plants made a control tube was used, i. e., a tube in which the broth was infected with saliva, but into which no antiseptic agent was placed, simply to act as a control for the results of the remaining tubes into which antiseptic agents were placed. In each instance the control tube presented a full development of bacteria, thus proving the accuracy of each set of plants. One drop of the essential oil was first used in the tubes and when it prevented development of bacteria the quantity was gradually decreased in other plants, until the least amount that would prevent development was ascertained. To divide the drop I placed ten drops of alcohol in a small vial, and into this placed one drop of the oil, the alcohol dissolving the oil immediately. I then used in the culture tube such proportion of the drop of the essential oil desired, one drop of the solution representing  $\frac{1}{10}$  drop of oil. Those drugs that were found ineffective with one drop were increased in other plants until found effective, or were given up as unsuitable or worthless as antiseptics. The same dropper was used throughout, and it was observed that a drop of alcohol is smaller in bulk than a drop of an essential oil. Because of this difference, ten drops of alcohol and one drop of an essential oil forms a ten per cent solution so nearly as can be figured, and one drop of this solution represents  $\frac{1}{10}$  drop of oil.

An antiseptic must be regarded as a poison to the vegetable cell, and many of them act also as poisons to the animal cell. I undertook this series of experiments for the determination of these differences of poisonous effects, with the idea that in selecting antiseptics for use in practice we should have special regard to the effect of the agents upon the animal tissue to which they are applied. To determine the irritating or non-irritating properties of these oils an extensive course of experiments with them has been conducted

during the winter months, in connection with sores artificially produced on guinea pigs, and also on my own person. To determine the effect of these agents when applied directly to soft tissue, the applications were made in each instance to my own person. And pardon me for saying that I have come to positive conclusions regarding some of the agents along these lines.

*Oil of Cassia.*—We find that  $\frac{3}{10}$  of a drop is the smallest quantity that will prevent development of bacteria in the unit of culture media, and there being 67 drops of oil of cassia in one c.c., this agent is effective as an antiseptic in 1 to 2233 parts; that is to say, one whole drop of oil of cassia would prevent development of bacteria in 2233 drops of infected broth. This explanation will hold good in connection with each agent used. Oil of cassia is undoubtedly the most potent of the essential oils as an antiseptic. I have analyzed at least a dozen samples of cassia, obtained from as many different sources, and have found them to be adulterated in each instance. One sample especially, shipped direct from China to a dealer in Chicago, was found to contain fixed oils in considerable quantity. Others were found to contain alcohol, etc. This oil as found in commerce to-day is not so potent an antiseptic by about one-half as was the cassia obtained ten years ago. A reference to the work done by Dr. G. V. Black about ten years ago, along the same line, serves to prove the correctness of this statement. The samples of cassia he used at that time were potent in 1 to 4000 parts. If I could have obtained a pure, unadulterated sample of cassia, it would have certainly outclassed oil of cinnamon as an antiseptic by a wide margin, but as it is they have proven exactly the same. However, you will notice when we discuss it, that of oil of cinnamon only 63 drops are required for one c.c., while of cassia 67 drops are required. This means simply that one drop of oil of cinnamon is just slightly larger in bulk than one drop of oil of cassia, so that this discrimination in the number of drops to the c.c. still places oil of cassia ahead of oil of cinnamon as an antiseptic, the potency of oil of cinnamon figuring out 1 to 2100 parts.

While oil of cassia stands at the very head of the essential oils as an antiseptic, it is at the same time the most poisonous in its effects upon soft tissue. As a test of its irritating properties, a pellet of cotton was saturated with it and placed in a small rubber cup to prevent evaporation. This was applied to the surface of the skin

and held there by means of a piece of court plaster large enough to cover it and stick tightly to the skin about the edges. This was retained in place for twenty-four hours, during which time the irritation to the soft parts was by no means pleasant. At the end of this period a blister invariably formed, but the inflammation in the tissues at this time was not very great. The blister occupied an area from one-half to one-third greater than that to which the oil was directly applied, and filled and refilled with serum several times before any tendency to recovery was noticed. At the end of forty-eight hours the inflammation in the parts involved was intense, and occupied an area four or five times as great as that to which the oil was directly applied, and numerous small independent blisters almost invariably formed about the circumference of the inflamed area. This condition continued for several days, and while the inflammatory process was at its height the sore was one of the ugliest and most formidable in appearance it has ever been my privilege to look upon. These sores were also very slow in healing, for it was with seeming regret on their part that the inflammation was permitted to subside and the parts to return to a normal condition. Fortunately these sores were fraught with no serious consequences.

To further test the irritating properties of this oil a sore, in connection with which there was considerable inflammation, was produced on a guinea pig and treated for a number of days with the spray by means of an atomizer. So long as this treatment was continued the parts could not recover, and the inflammation was greatly increased. Suppuration was then produced by infecting the sore with pus microbes. This in turn was treated with the spray, with the result that the germs were destroyed and the pus formation stopped, thus proving conclusively that this agent is an excellent germicide when applied to suppurating surfaces, as well as a most potent antiseptic.

It is clearly proven to my mind that while the antiseptic and germicidal properties of this oil are of the highest order, it is one of the most irritating in its effects on soft tissue of all the agents with which we have anything to do. And because of these effects, as outlined above, I feel justified in making the statement that oil of cassia should never be used as a dressing in the root-canals of teeth.

There is another reason why it should not be used and that is its proneness to cause discoloration of the teeth. In almost every

instance where its use is continued for a time the teeth are more or less discolored, in some cases very considerably, and this is one of the most difficult forms of discoloration to correct that we meet.

Is it not reasonable to suppose that when cassia is used in the treatment of pulpless teeth the above disagreeable conditions may occur in the soft tissues occupying the apical space, and the peridental membrane become involved in the inflammatory process? Have you ever thought that the excessive flow of serum which so frequently occurs from the tissues of the apical space of teeth that are being treated with this oil is nothing more or less than the discharge of actual blister, as in the cases above recited? If these are reasonable suppositions, and I believe they are, is it still a source of wonder to you that teeth so often under these circumstances suddenly develop such extreme tenderness to pressure?

Oil of cassia, however, has a place in our practice as dentists. Cassia water is sometimes very useful in the treatment of fistulous abscesses, for it is so stimulating to the tissues that it excites a healthy action when other agents fail. Oil of cassia is exceedingly useful in the treatment of severe cases of pyorrhea, so-called, where the pockets about the teeth are deep and considerable pus is present. In such cases it may be used in full strength by means of a drop-syringe, as the oil is not permitted to remain in contact with the soft tissues long enough to cause trouble, being so soon diluted by the fluids of the mouth.

*Oil of Cinnamon of Ceylon.*—We find that  $\frac{3}{10}$  of a drop prevents development of bacteria in the unit of culture media, and that 63 drops constitute one c. c., thus showing this agent effective as an antiseptic in 1 to 2100 parts. Oil of cinnamon of Ceylon, as you well know, has very much the same nature as oil of cassia, but in some respects there is a marked difference between them. It has been demonstrated that oil of cinnamon is not so irritating to soft tissue as oil of cassia. An application to soft tissue in the same manner that cassia was applied, left for twenty-four hours caused considerable irritation and formation of blister. At the end of forty-eight hours the inflammation was severe, but not so intense as that caused by cassia, and the area of tissue involved in the inflammatory process was not so great. Also the blister that developed by the application of cinnamon was by no means so large as that from cassia, occupying the center of the inflamed area and spread-

ing over tissue in extent equal only to that to which the agent was directly applied. The blister and inflammation were not so persistent as with cassia, the former refilling with serum usually but two or three times and the inflammation readily passing away.

A sore attended with much inflammation on a guinea pig was treated with the spray, with the result that it was further constantly irritated and thus prevented from healing. Suppuration was then produced in the sore and the spray again applied, when the germs were destroyed and the pus formation stopped. The action of cinnamon was not so vigorous as that of cassia, but to my mind cinnamon is altogether too irritating for use in the treatment of pulpless teeth.

A *Synthetic Oil of Cinnamon*, prepared in both France and Switzerland, and a sample of which I secured this spring from the first lot sent to this country, proved to be as potent an antiseptic as the regular oil,  $\frac{3}{10}$  of a drop preventing development of bacteria in the unit of culture media. 64 drops of this oil constitute one c. c., proving it effective as an antiseptic in 1 to 2133 parts. It is, however, in its first effects more irritating to soft tissue than the oil of cassia. An application was made to soft tissue, and at the end of fifteen hours a fully developed blister, in extent larger than the area of tissue to which the oil was applied, resulted. There was very little inflammation or discoloration of the tissues, although the first effect of the oil on the soft tissue was so vigorous that very much tenderness and inflammation were confidently expected to follow, but in this I was disappointed. The blister continued to refill with serum several times, but no tenderness or inflammation worthy of mention actually developed in the surrounding parts. I cannot recommend this oil for use in the treatment of pulpless teeth.

*Beechwood Creosote* is the next agent from point of potency as an antiseptic;  $\frac{5}{10}$  of a drop prevented development of bacteria in the unit of culture media. There are 64 drops in one c.c., thus showing creosote effective as an antiseptic in 1 to 1280 parts. This agent is kind to soft tissue, for an application remaining thirty-six hours produced practically no irritation. There was just the slightest evidence about the center of spot where it was applied, but no inflammation. Surface of skin was slightly discolored, and burned or seared over, but not to an extent that caused the loss of any tissue. A sore on a guinea pig was treated with the spray, with the result that the inflammation subsided and sore healed rapidly.

Another sore accompanied with suppuration was treated in like manner, and the germs were readily destroyed, the pus formation stopped, and continued treatment resulted in the gradual healing of the sore. Creosote has proven its right to stand among the first from point of potency as an antiseptic, and because it is practically non-irritating to soft tissues is a safe agent, and in some cases a very desirable one for use in the treatment of pulpless teeth. For a case of putrescent pulp of long standing, for instance, one in which the lateral openings and dentinal tubuli are completely saturated with mephitic odors and gases, creosote in my judgment is the most effective and desirable of the available agents. It is very penetrating and most persistent in its effects, and I have used it to good advantage in severe cases of apical pericementitis. In some instances, however, where discoloration of the teeth has occurred, it has seemed due to the action of this drug. Creosote having more or less the nature of carbolic acid, possesses to a certain extent the properties of a local anesthetic, and because of this property it has a rather beneficial effect upon inflamed tissue.

*Oil of Cloves.*— $\frac{6}{10}$  of a drop prevented growth in the unit of culture media; 69 drops constitute one c.c., showing it effective as an antiseptic in 1 to 1150 parts. Oil of cloves is absolutely non-irritating to soft tissue and produces no discoloration. An application to the surface of the skin for thirty-six hours left no more trace than so much sterilized water would have done. Sores produced on guinea pigs were treated with the spray of oil of cloves, and the inflammation subsided more rapidly than when treated with any other agent, and the sores healed as rapidly as could be wished. A sore in which suppuration was produced with pus microbes was treated with the spray of this oil, when the germs were destroyed and the formation of pus stopped, simply proving beyond question that while effectively destroying microbes, the only action of the oil in contact with irritated, inflamed soft tissue is that of a soothing agent, serving to reduce the irritation and inflammation and returning the disturbed tissue to its normal condition.

A sore produced on my arm by an application of cassia became infected and pus formed. This was washed thoroughly with a 1 to 1000 solution of bichlorid of mercury for several nights and dressed with iodoform, nosophen and aristol, resulting in an absolute failure to stop pus formation. One night, after washing the sore thor-

oughly with the bichlorid solution, I poured oil of cloves over the raw tissue. There was only a slight smarting for a few minutes, after which the action was quieting. The application was held in position for twenty-four hours, and when removed no pus was present and the little granulations could be seen all over the surface of the sore. It was immediately dressed with aristol and let alone for forty-eight hours, at the end of which time it was healed.

Another sore on the lower part of my right leg, the result of an application of formalin, was causing a great deal of trouble. The inflammation was severe, the tissues very sore, the muscles felt bound up and painful, it being exceedingly difficult to walk. Continued treatment with ordinary remedies gave no relief. One morning, after having thoroughly cleansed the sore, a liberal quantity of oil of cloves was placed on it and the bandage applied. Within four hours' time the disagreeable drawn condition of the muscles passed away, pain ceased, and the foot could be moved freely in all directions and could be used in walking just as well as ever.

Oil of cloves for general use in the treatment of pulpless teeth is certainly one of the best agents at our command. It possesses the property of destroying or rendering inert septic and infectious material, and in cases of apical pericementitis is perhaps the best that can be used. It possesses local anesthetic properties to a marked degree, and because of this fact serves to reduce the inflammation in the tissues in the apical space and causes them to return to a normal healthy condition.

*Oil of Bay.*— $\frac{7}{10}$  of a drop prevented development in the unit of culture media; 72 drops are necessary for one c. c., showing this agent effective as an antiseptic in 1 to 1028 parts. Oil of bay is a comparatively new agent to me, and I feel warranted in stating that it is new to the vast majority of the dental profession. A year ago last winter a gentleman said he had been using it for some time in the treatment of pulpless teeth, and that so far as his clinical experience went had found it to be an agreeable and efficient agent, as he had not observed that it produced irritation. At his request I tested it, with the above result, which places this oil in the foremost ranks of antiseptics. I have used it more or less since, and in one case thought the irritation and tenderness induced was directly due to the action of the oil, but have since observed none of these bad effects. I concluded I was wrong; that there must have been some

foreign, irritating substance present which caused the trouble. I have made two applications of the oil to soft tissue, retaining each in contact for thirty-six hours, for the purpose of observing its effect, and no irritation resulted in either case.

A sore was produced on a guinea pig with an irritant which caused intense inflammation, and was treated with the spray of bay for several days. The closest observation did not reveal any additional irritation; on the contrary the inflammation gradually subsided, but not so rapidly or willingly as when some other agents were used. A suppurating sore treated with the spray yielded very nicely, the germs being destroyed and pus formation stopped. I think we are safe in concluding that oil of bay is a valuable addition to our list of agents for the treatment of pulpless teeth.

*Oil of Sassafras.*— $\frac{7}{10}$  of a drop prevented development of bacteria in the unit of culture media; 70 drops are required for one c. c., proving it effective as an antiseptic in 1 to 1000 parts. Oil of sassafras in contact with soft tissue for thirty-six hours produced no irritation. I have treated sores in which there was marked inflammation with the spray, and the result was much the same as with the last named agents, the inflammation subsiding, irritation passing away and the sore healing. While a potent antiseptic, it has not exhibited nearly the ability to destroy germs and prevent pus formation that the stronger agents have. I have never used oil of sassafras in the treatment of pulpless teeth, but can see no reason why it should not be a useful and harmless agent in this connection.

*Oil of Peppermint.*— $\frac{8}{10}$  of a drop prevented development of bacteria in the unit of culture media; 72 drops are necessary for one c. c., showing this agent effective as an antiseptic in 1 to 875 parts. An application of oil of peppermint to soft tissue continued for thirty-six hours produced no irritation, no discoloration of the skin, nor inflammation, thus showing conclusively that it is non-irritating to soft tissue. A sore with considerable inflammation was treated with the spray, with the result that the inflammation readily yielded, irritation subsided and the sore healed. Another sore, suppurating, was treated in the same way, and the germs were destroyed and pus formation stopped, which proves that this agent is not only an antiseptic, but also destroys the germs and thus prevents pus formation. Three years ago I used this agent a little in treatment cases, but discarded it simply because of the persistent,

penetrating odor. Other than that I can see no objection to its use in pulpless teeth.

*Dr. Black's "1-2-3."*—This is the next agent in point of potency. 1.4 drops prevented development in the unit of culture media; 65 drops are necessary for one c.c., proving this agent effective as an antiseptic in 1 to 454 parts. As you well know, this is a preparation given to the profession a number of years ago by Dr. G. V. Black, consisting—the so-called mild solution, and this is the one used in these tests—of one part oil of cassia, two parts carbolic acid crystals and three parts gaultheria. It has always proved itself a most efficient agent in the treatment of pulpless teeth, and has been used by many practitioners for the last ten or twelve years, possibly more than any one other agent. I have used it continuously since starting practice and have never observed any irritation of the soft parts, tenderness of the tooth to pressure, or inflammation resulting from its use. Possibly some of you will wonder why "1-2-3" is such an efficient and desirable agent, consisting as it does of cassia, carbolic acid and gaultheria; carbolic acid being not a positive persistent antiseptic, but one whose restraining effects upon the development of bacteria are only transient; oil of gaultheria being absolutely worthless as an antiseptic, and the use of cassia being so thoroughly condemned because of its extremely irritating properties. Of course this agent depends upon the cassia for its antiseptic properties; the gaultheria is used as a diluent to the cassia, and the carbolic acid employed more especially because of its anesthetic effect on soft tissue. When these different drugs are properly mixed to form "1-2-3," Dr. Black thinks there is more or less of a chemical union between them, so that the individuality of each seems to be lost, and the result is the formation of a new agent with different characteristics from those possessed by the three individual ones. At any rate it is harmless to soft tissue, for an application left for thirty-six hours produced no irritation whatever, and there was only a slight searing and discoloration of the skin's surface. Sores much inflamed were treated with the spray and no further irritation produced. Its action was more like that of a neutral agent, so to speak, not irritating the sore, nor imparting to an appreciable extent any soothing influence, the inflammation subsiding just about as it would if left to itself with all irritating influences removed. A suppurating sore was treated with the spray of this agent, when it demon-

strated its right to be classed as a very potent germicide, for the germs were destroyed and pus formation ceased.

"1-2-3" as formed with the present cassia of commerce is not so potent an antiseptic as that formed with cassia obtainable several years ago. This is due to the fact before stated, that cassia is so adulterated at the present time. In fact, the power of "1-2-3" is lessened in almost direct proportion to the adulteration of the cassia.  $\frac{7}{10}$  of a drop was effective in ten c. c. of broth, as shown by Dr. Black's experiments several years ago. "1-2-3" is abundantly effective, as shown by these experiments, but the time may come when it will not be, if cassia continues to be adulterated. For general use in the treatment of pulpless teeth "1-2-3" is certainly an effective and excellent agent.

*Carbolic Acid, 95 Per Cent.*— $1\frac{8}{10}$  drops prevented development in the unit of culture media; 61 drops are required for one c. c., showing this agent effective as an antiseptic in 1 to 338 parts. Carbolic acid is not a permanent, positive antiseptic, as its restraining power on the development of bacteria in the majority of plants made was only transient.  $1\frac{8}{10}$  drops prevented development for a period of three days, after which the bacteria developed in almost every instance. The restraining effect upon the development of bacteria seems to be in almost direct proportion to the quantity of the agent used in the culture tube. The use of carbolic acid in dentistry is so familiar that I need not dwell on this point.

*Oil of Myrtol.*— $1\frac{9}{10}$  drops were necessary to prevent development of bacteria in the unit of culture media; 68 drops constitute one c. c., showing myrtol effective as an antiseptic in 1 to 357 parts. Oil of myrtol is an agent which I have used but little in practice, for in the majority of cases there has been more or less irritation produced, and some tenderness of the tooth developed, so that it impressed me as being somewhat of an undesirable agent. An application of myrtol to soft tissue for thirty-six hours produced decided irritation, there was a strong tendency to the formation of blister, and the surface of the skin was destroyed. The irritation and inflammation present continued for two or three days, gradually abating. A sore on a guinea pig treated with the spray showed evidence of further irritation, and so long as the treatment was continued the inflammation refused to subside. A suppurating sore treated in the same way was certainly benefited by a consequent destruction of the

germs and cessation of pus formation. There is no doubt that this agent is very irritating and should not be generally used in the treatment of pulpless teeth. There are cases where I use strong myrtol water, seemingly to good advantage, and these are in connection with abscesses with fistulous openings, especially those of long standing, in which there is more or less irritation of the soft parts throughout the tract of the fistula, and that uneasy, disagreeable sensation often experienced by the patient in these cases.

*Oil of Cajuput.*—6 drops are necessary to prevent development in the unit of culture media; 72 drops are necessary for one c.c., proving this drug effective as an antiseptic in 1 to 120 parts. Applications of this oil to soft tissue retained for thirty-six hours produced no evidence of irritation, in fact the discoloration of the skin was very slight and remained but a short time. An inflamed sore on a guinea pig was treated with the spray and no increase of the irritation was produced. Another sore suppurating, was treated in the same way, with the result that the germs were gradually destroyed. Its action, however, was not positive, for if the treatment was discontinued for a day or two the pus formation continued as before.

At first I used oil of cajuput more or less in the treatment of pulpless teeth, but latterly have not employed it in this connection; in fact the only use I now make of it is occasionally to moisten the inner walls of the root-canals previous to filling with gutta-percha. For this purpose its non-irritating nature recommends it, and especially the fact that it is a solvent of gutta-percha and causes the latter to adhere to the walls of the canals.

*Eucalyptol* (Sanders' and Merck's), 6 drops each of these preparations are necessary to prevent development in the unit of culture media; 70 drops to one c.c., showing each preparation effective as an antiseptic in 1 to 116 parts. Eucalyptol in contact with the skin for thirty-six hours produced no evidence of irritation, inflammation nor discoloration, thus proving that the agent is non-irritating and harmless in contact with soft tissue. A sore with considerable inflammation was treated with the spray, with the result that the inflammation readily yielded, the irritation subsided, and the sore healed, thus further proving that it is non-irritating even to injured inflamed soft tissue. A sore with suppuration was treated in the same way, with virtually the same results as with cajuput; it exhib-

ited a restraining influence upon the development of bacteria and pus formation, but the treatment being discontinued for a while pus formation went on as before. As a drug to place in the root-canals of teeth after the removal of a pulp, following devitalization, in order to keep the parts healthy for a few days previous to root-canal filling, it is perhaps the agent that I use more than any other, being certainly harmless and never exciting irritation. I usually employ it for the purpose of slightly moistening the inner walls of root-canals previous to filling.

*The Oil of Eucalyptus* as found in the market produced only a restraining effect upon the development of bacteria when a saturated solution was formed with the bouillon.

*Oil of Gaultheria* was carried in my experiments as high as 8 drops, this quantity forming a saturated solution in the broth—that is to say, the broth had taken up or dissolved all of the oil that it could possibly retain, there being also a large number of free globules floating about in the broth, and still development of bacteria took place quite abundantly, showing that this agent is useless in restraining the development of bacteria.

*Eugenol*.—This agent resulted in the same way as gaultheria. 8 drops were used in the unit of culture media, which amount formed a saturated solution with numbers of globules of the free oil floating about, and still the bacteria developed, thus proving that eugenol also is useless as an antiseptic.

*Formalin*.—Of late the dental profession has taken up this agent for the treatment of pulpless teeth and abscesses, for devitalizing pulps, etc., and many are reporting wonderful results from its use. Not long since I read an article in one of our journals where the writer paid a glowing tribute to this agent as a most efficient and desirable one for the treatment of almost all conditions of pulpless teeth. Having had some experience with it myself, and because of many negative results experienced being suspicious whether it was a proper agent to be used about the mouth, I decided to investigate it as thoroughly as possible. First I tested it as to its antiseptic properties, and found it to be very powerful. Of the formalin preparation, which is a saturated solution of the gas formaldehyd in water (the latter taking up about 40 per cent of the former),  $\frac{4}{10}$  of a drop prevent development of bacteria in the unit of culture media; 56 drops are necessary for one c.c., showing formalin potent as an

antiseptic in 1 to 1400 parts. Somebody has been so enthusiastic over this agent as to state that it is fully as potent an antiseptic as bichlorid of mercury. This is certainly a mistake. I prepared a 1 to 1000 solution of bichlorid of mercury and found that it required 9 drops of this solution to prevent development of bacteria in the unit of culture media. Then I made a 1 to 1000 solution of pure formaldehyd, which we now have in a solid state (the gas being reduced to such by chemical processes), and of this solution found that it required 40 drops to prevent development of bacteria in the unit of culture media, thus proving that formaldehyd is not so potent an antiseptic as bichlorid by at least one-fourth. I next resolved to determine its ability to irritate soft animal tissue, just as I did with the other agents. I took a small pellet of cotton, saturated it with formalin, placed it in a small rubber cup to prevent evaporation, applied it on the surface of the skin on the lower part of my right leg, and covered it over with a large piece of court plaster stuck tightly about the edges. This was placed there the 14th of last March. At 12:30 a.m. I went to bed and to sleep, but between four and five in the morning I was awakened by the pain and could get no rest after that. The pain was intense and of a very peculiar character. It seemed as if something were inside my leg gripping it with a vice. Then it would take a turn and twist about, as if tearing the inside out. It would stop for an instant, and then the performance would be repeated with renewed vigor. The pain continued more or less severe all day. I wished to keep the application in place for twenty-four hours—the time adopted for the other agents—but at the end of twenty hours the pain had been so constant and the tissues began to look so ugly that I removed the drug. The tissue to which it was applied and for about two inches in all directions was turned snow-white, as if all the blood were driven from the parts. The pain was lessened very considerably within a short time after the application was removed. The tissue to which it was directly applied was perfectly anesthetized to a considerable depth, but just at the circumference of the application there was considerable tenderness. There was much swelling which seemed to be more like that of edema than of true inflammation. In two or three days some color began to return to the parts, except where the agent was directly applied, which latter has never regained normal color. In about two days more a line, purple in

color, began forming at the circumference of the point of application—a line of demarcation—and it became apparent that there was to be a break in the tissues. This break occurred and sloughing took place; considerable tissue was lost all over the surface of the inflamed area. The tissue in the center raised about the edges, but was very obstinate about coming away. From the time the agent was thoroughly absorbed in the tissues I was not up to the standard physically, my appetite was more or less impaired, and my digestion and eliminative organs were somewhat interfered with. These conditions continued to grow worse until the climax came in a bad case of systemic poisoning, the effete matter being thrown off through the medium of a severe diarrhea, and also much vomiting—the former continuing for three days, the latter for one, following which time my physical condition rapidly improved.

Having seen a number of cases which have been treated by physicians with solutions of formalin varying in strength, in which more or less sloughing of the parts has resulted—one which I saw not long since where as low as a 2 per cent solution was used, in connection with which considerable sloughing resulted—and also because of the very vivid recollections of my own personal experience with it, I have come to the conclusion that we should get along without it in the treatment of diseased conditions about the mouth.

As I have devoted a paper to this agent before another society, I will not give my observations of it in more detail here. My paper is now too long for me to consider the subject of the selection of antiseptics with a view to utilizing their therapeutic effects in individual cases in connection with their antiseptic powers, but this can be fairly made out from the observations related.

**INCOMPATIBILITIES.**—In an article in the *Berliner klin. Woch.* Professor Blnz, the pharmacologist of Bonn, calls attention to the following incompatibilities: Preparations of iron with tannic acid produce ink; chloroform in glycerin or tincture of iodine in water will not mix; sulphonal is very slightly soluble in water; calomel with potassium iodide results in the formation of the irritant mercuric iodide; tincture of iodine and mercurial ointment applied locally and together produce intense irritation; permanganate of potassium added to syrups causes a brown coloration, due to the abstraction of oxygen. Combinations of explosive powders, for example, potassium chlorate and tannic acid, and also under certain circumstances combinations with permanganate of potassium, sulphur, and carbon, should not be prescribed.

## Digests.

**CONTROL OF MOUTH-BREATHING.** By W. Freudenthal, M.D., New York. In the last issue is an article on "A Bridle for the Control of Mouth-Breathing." [September DIGEST, p. 639.] Permit me to sound a note of warning. Every human being, young or old, will and must breathe through the nose with the mouth closed, unless there be some pathological condition in the nose, retropharynx or pharynx to prevent it. Physiologically this nose respiration is always present under normal conditions, and it is only necessary to refer to the text-books on physiology and laryngology for confirmation of this fact. Therefore the assertion of the author, that "such obstructions (viz., adenoids, stenoses, hypertrophied tonsils, and turbinated bodies, echondroses, nasal polypi, etc.) often appear as the results of the non-use of the nose in respiration," is based on a physiological impossibility.

On the other hand, if there are obstructions present, the author no doubt will agree with me that the best thing to do is to remove them. Then the patient will very quickly breathe through the nose without bridle or other mechanical appliance. But unfortunately we are not always able to remove certain impediments in nasal respiration—say, for example, a chronic nasal catarrh. If in such a case we apply the bridle to a child, two possibilities confront us; either the bridle is fastened so loosely, as I have frequently noticed with similar appliances, that the child still breathes through the mouth and not through the nose, in which case it is not harmful but of no use; or the bridle is fastened so tightly that the child cannot separate the jaws. In this case the child will choke to death. And it is this possibility against which I should like to warn my colleagues. If a child cannot get any breath through the nose and if the mouth is tightly locked, provided there is no loss of teeth, giving space through which air could pass, there is only one thing left such a patient—suffocation.—*Med. Rec., Sept. 1898.*

\* \* \*

**TO TAKE A PARTIAL IMPRESSION WHEN THE TEETH CONVERGE OR DIVERGE.** By F. W. Bliss, D.D.S., Santa Cruz, Cal. Read before Calif. State Dental Assn., June 22, 1898. First take an impression in wax and make a model from it. Then

soften and mold pieces of base-plate material upon the alveolar ridge of the model between the converging teeth, and use them for impression trays. Place upon them plaster of paris and put in the mouth in their respective positions, and after the plaster has hardened and before removing take another impression in modeling compound. Now remove the modeling compound first and then the base-plate impression; they will come from the mouth separately. Place them together so that they will sustain the same relations that they had in the mouth. Make a model from this combination and it will be as perfect a representation of the parts as will be required.

*Discussion.* Dr. Goddard: I would ask Dr. Bliss how he uses the base-plate, whether wet or dry, and about what temperature? and whether he uses it in the mouth direct?

Dr. Bliss: I think it may possibly be used in the mouth. I have been in the habit of heating it with hot water. Although it is a little longer way, I think it is easier to trim the base-plate part out of the mouth. You can heat it with water or dry heat.

Dr. Goddard: Some years ago I used something on a general parallel with that method. I took a soft piece of modeling compound, placed that in this dovetailed space, which I understand to be the shape of the space between the converging teeth, making in the mouth a core of modeling compound; before that had got hard, or perhaps after it was hard, it could be pushed up laterally over this dovetailed space, and then the sides trimmed so that it slipped from crown of tooth towards gum; these little chunks of modeling compound then were placed back in the dovetailed spaces and a plaster of paris impression taken. This would come out of mouth, leaving the modeling-compound cores in the dovetailed spaces. These could be pushed out laterally, put in impression and model made over that.—*Pacific Med. Dental Gazette, Sept. 1898.*

\* \* \*

DOUBLE RESECTION OF THE LOWER MAXILLA. By Eugene S. Talbot, M.D., D.D.S. In the *Cosmos* for August, 1898, appears an article (reprinted in the October DIGEST, p. 690) by Dr. Edward H. Angle of St. Louis upon the above subject, in which he claims to be the first to suggest this operation and that it had been discussed for four years by surgeons with regard to the prognosis, hence he deems some suggestions as to technique and plans of fixa-

tion not amiss, especially since he claims if the operation be properly performed, it may become of considerable use and importance. In those extreme types of malocclusion familiar to every one, he remarks, the proper functions of the teeth have become almost wholly impaired, as well as speech greatly interfered with, and the appearance of the patient transformed to marked deformity, constantly attracting attention and comment and being a source of humiliation to the patient, whose condition, if he be possessed of a sensitive nature, becomes truly pathetic.

The late Dr. W. W. Allport, who suggested this operation over four decades ago, consulted the late Dr. Brainard of Chicago, admittedly then one of the most skillful American surgeons, in regard to its propriety. Sections of the inferior maxilla were to be removed at the location of the first bicuspid, the section to be cut in such a manner as to bring the incisors directly in contact with the superior incisors, and not throw the anterior part of the jaw downward, as would be the case in Dr. Angle's operation. Later he consulted Drs. Moses Gunn and Powell of Chicago. They were all of the opinion that such an operation could not be successful; first, owing to the impossibility (at that time, as they supposed) of holding the parts steady in place. Second, that the arteries and nerves would not unite, thus producing death of the pulps or teeth in the anterior part of the jaw; hence the operation was not performed. The first difficulty can no doubt be overcome by modern methods. The second requires demonstration.

The report of a case in the *July Cosmos* does not indicate a very successful operation: "At the end of the third week Dr. Blair brought Mr. K. to my (Dr. James W. Whipple, St. Louis) office, when to my regret I found a very serious and unfortunate condition of affairs existing. The means adopted for holding the superior borders of the dissevered maxilla in position had proved to be entirely ineffective. The parts had failed to unite on either side. On the left side there was an effusion of bloody pus, which oozed into the mouth when the parts were pressed together. The right side was in a better condition, but no union of the bone had been effected. The jaw was stiff and sore, and the teeth could be separated from the upper only a short distance."

The operation was performed December 19; Dr. Whipple was still trying to adjust an appliance to hold the parts together on the 26th

of the following April. If the pulps in the eight anterior teeth were alive, it is a revelation in vitality of nerve and blood-vessel tissue. If such an operation were possible I should quite disagree with Dr. Angle as to the method of improving the appearance of this person's face. What he needs is an expression of character. The deformity is the result of arrest of development of the face and superior maxilla rather than excessive development of the lower jaw, hence I should suggest an improvement of the face generally. The deformity should be corrected by bringing forward the upper teeth (making the cuspids prominent) and the alæ of the nose, thus giving character to the face rather than increasing the deformity and further humiliating the patient.—*International*, Oct. 1898.

\* \* \*

**TUBE-DOWEL CROWN.** W. A. Heckard, D.D.S., Indianapolis, Ind. Of course you have never had a dowel crown of your own work come back on you to have the root treated, but you have doubtless had to chip the porcelain off a Richmond, or split a Logan crown, and bore out a platinum pin to get access to a root that had been improperly treated by some other dentist, only to find that the apical foramen had been drilled through, thus causing constant distress to the patient. Passing over the many things that cause and cure such roots, how do you guard against subsequent trouble when you find a case of this kind? Does not cotton saturated with your "pet" canal-dressing usually stop all trouble? I find cotton and campho-phenique removes all soreness. While other more solid materials than cotton may do the work, they are liable to be pushed through the foramen, and you know what trouble and time it takes before you can get the material out again; but a cotton twist can be drawn out easily. I have treated many teeth in this manner, a large number of them cases that could be reached through a filling, or even through a gold cap, but of late years I have handled in the following way teeth that call for a porcelain crown: Nothing will give a better result or more satisfactory operation for your patient than to use a "hollow pin crown," especially in incisors when the apical foramen has been punctured, or in roots in which you suspect the possibility of future trouble. But the hollow pin seems to be the drawback. Friends have said: "If I could only get a tube I could make the crown easily enough." Well, the tube is easily made. Take a piece of gold plate and an old excavator (file the

excavator if it is not small enough; see Fig. 1), then start the gold with your fingers just as though you wished to double it in the middle. When you have bent it to an angle of 45 degrees, place it on the excavator, and you can round it with a small hammer very easily. As the two edges come close together, use a flat file on them until they just touch. Use a very small bit of solder in making the joint. The crown is then made in the usual manner, being careful not to fill the tube in backing up the facing with gold. (See Fig. 2.) Cut the tube off flush and finish the gold.



Fig. 1.



Fig. 2.



Fig. 3.

Now comes the point. Before setting or cementing on the crown, roughen the tube on the outside with a file and fill the inside with a plug of cotton. Then put a wisp of cotton in the end of the root. Set the crown in cement in the usual manner, and after the cement has hardened remove the cotton plug from the tube. Sometimes a little cement squeezes into the root end of the tube. If this has occurred, drill through it and remove the cotton left in the end of the root, through the tube. You now have a well-crowned root, with access to the apical foramen.—*Indiana Dent. Jour.* Sept. 1898.

\* \* \*

**FURTHER NOTES ON THE BACTERIOLOGY OF THE MOUTH.** By Kenneth W. Goadby, L.D.S. Eng. There is no region of the body more exposed to the advent of microorganisms, unguarded from their entrance and adapted to their growth, than

the mouth; in fact, at one time or another most known organisms may be found therein. The bacteria of virulent disease have frequently been observed in the oral cavity of perfectly healthy individuals, organisms which if transmitted to a susceptible person would undoubtedly produce serious or fatal results. The perception and appreciation of these facts is one of most vital interest to all who practice dental surgery. The most superficial and casual observer is at once struck by the fact that all mouths contain bacteria, although the numbers and species vary within wide limits and bear a distinct relation to the environment of the subject. Notwithstanding the enormous variety of organisms that may occur in the mouth, there appears to be a distinct flora, flourishing most in uncleanly conditions and decreasing to but a few species in normal healthy mouths. I have been especially interested in the bacteria which are to be found in unhealthy mouths, and whose biological characters have so far not been described. In every case examined the writer has been able to isolate a streptococcus identical with the one described, whilst other observers have isolated a similar organism, and a series of experiments has conclusively proved that the diplococci normally occurring in the mouth grew out into the streptococcus brevis when cultivated. Cover glasses were coated with agar and planted with the diplococci of the mouth, the preparation being so arranged that it could be examined microscopically. After incubation the diplococci were found to have developed into streptococci which gave the cultural peculiarities of streptococcus brevis.

The favorite site for bacterial growth is along the gum margin and the spaces between the teeth, a condition no doubt arising from the accumulation of food, and the inability of the tongue to clear such places. In patients suffering from gingivitis marginalis or from pyorrhea alveolaris, enormous quantities of bacteria are to be found along the gum margins and in the "pockets" in this region; in fact the white deposit (or materia alba of the Leeuwenhoek) is simply a teeming mass of bacteria; how any teeth resist this invading host is a mystery, many of them being acid producers and capable of liquefying gelatin. The same occurs wherever much tartar is present upon the teeth, and where occurring locally, as on upper molars, there a corresponding increase of organisms takes place even in an otherwise healthy mouth. The removal of the tartar and the use of antiseptics restores the part to a normal condition.

The removal of carious teeth and septic roots also rapidly diminishes the number of organisms present, and the author has found that often the only organism remaining is the streptococcus, although many species were present in the first place; under these circumstances the practice of leaving roots in the mouth and covering them with a denture cannot be too greatly deprecated, whilst on the other hand the writer entirely agrees with Tomes that previous to the removal of such teeth the application of antiseptics may do much to prevent local or general infection, which, though rare, does at times undoubtedly occur.

In all the unhealthy mouths the writer has examined (fifty in all) two organisms or types of organisms were found, viz., vibrios (spirilla and commas) and huge thick-jointed threads, whilst besides these short motile bacilli are always to be met with. Before discussing these bacteria however, it will be as well to say a few words about certain well-known organisms not peculiar to the mouth, but which are constantly to be found in it.

Chromogenic bacteria of many species are often to be found in the mouth and invariably under diseased conditions of that cavity. Miller claims to have isolated eight different organisms producing a yellow color, viz., *B. fluorescens non liquefaciens (motilis)*, an organism commonly found in water. Podbielskij, Losenthal and others have noted this organism, whilst Mr. Pakes, of Guy's Hospital, informs me that he has often found it in cultures made from the mouth. Miller describes or rather mentions a "vibrio" which produces a green coloration, which from the meagre remarks is probably the organism referred to above; the *B. fluorescens* in question is extremely motile and may have so misled the observer. In all the mouths from which the author obtained this chromogenic organism the tartar was stained a greenish color, whilst in two of the cases distinct green staining of the front upper teeth was present. Miller's assertion that green staining cannot be accounted for by an organism which only colors the medium and is itself colorless, is by no means in keeping with observed facts, especially when we consider the case of "blue-pus" colored by the *B. pyocyaneus*, and it seems perfectly reasonable to suppose that a bacillus growing along the neck of a tooth may diffuse its pigment over the tooth surface.

Staphylococci are another variety of organism constantly to be met with in unclean mouths, and of these the most common is the

albus; in this my researches agree with Nettler; the other staphylococci, aureus and citreus, also occur, the former being least common and occurring in about 7 per cent of cases. Yeasts are almost always present, and the writer has several times obtained the rosa hefa giving a fine rose pink coloration. A short motile bacillus producing a fine red color has been obtained from five mouths.

*Morphology.*—Extremely short bacilli with rounded ends, often occurring in pairs and looking extremely like a diplococcus; a twenty-four hours' broth culture shows distinct motility, stains with usual anilin dyes; spore formation not observed.

*Biological Characters.* *Agar.*—Smooth raised streak, whitish with defined edge in forty-eight hours. Pinkish color after three days, eventually becoming red. *Potato.*—Slow coloration, seven to fourteen days; curious bright red, globular or bead-like colonies. *Broth.*—Twenty-four hours, slight opacity, no marked turbidity; stringy precipitate with a faint red tinge in five days. Motile bacilli. *Gelatin.*—Very slow growth, no liquefaction, but growth to bottom of slab, color only at top; nail growth. *Litmus milk.*—Grows fairly well, acid reaction in several days, generally seven to ten, color eventually reduced; no clotting. Miller figures a red coccus, giving pigment aerobically only. Rosenthal also mentions a red coccus, micrococcus roseus, obtained from the mouth. A great many other chromogenic bacteria are to be found in the mouth, but space does not admit of their further discussion.

Among the special mouth organisms none have attracted so much attention as those thread-like and filamentous forms unhappily grouped under the term "leptothrix" by Robin, Hallier, Vignal and many others, for no special reason apparently than that they exist in the mouth in thread-like forms. Miller, who was the first to recognize the inadequacy of the term leptothrix as applied to any thread-forming organism, and being unable to cultivate them upon artificial media, provisionally divides the filamentous forms of the mouth into three species, morphologically and according to their reaction with acidulated iodine, as follows: (a) *Leptothrix innominata*, thin wavy threads with little or no segmentation, and giving a yellow color with acidulated iodine; (b) *Bacillus maximus bucallis*, thick, much-jointed threads generally giving a blue coloration with iodine; (c) *Leptothrix bucallis maxima*, similar to (b) but with larger joints and giving no reaction with iodine.

This reaction to iodine can scarcely be considered a sufficient difference between a "leptothrix" and a bacillus, whilst if any bacillus which forms threads is to be *ipso facto* a leptothrix, then under this head come most known bacilli, and many if not most vibrios. Leptothrix is a term that should be used to express a species and not a morphological form. In Baumgarten's classification a leptothrix is described thus: Spherical, rod-shaped or filamentous forms, the last showing a difference between the two extremities; spore formation not known. Cocci like reproductive bodies are formed by segmentation of the rod-shaped elements.

If we take a small portion of the white deposit from the gum margins of individuals suffering from gingivitis marginalis or pyorrhea, and make a coverslip preparation, the slide invariably shows one or more of the thread-like forms noted above, and in making cultures from such cases I have succeeded in isolating a thick, heavily-jointed organism which grows out into long threads and appears to be the "leptothrix buccalis maxima" of Miller, if we are guided by the iodine reaction; but as the organism to be described is not a leptothrix in Baumgarten's sense of the term, the author has decided to reserve the term "Bacillus maximus buccalis" for this organism, a most decided bacillus and which if labeled as a leptothrix would only complicate the confusion extant in the nomenclature of mouth-bacteria.

At first the writer had great difficulty in obtaining even an impure culture of this bacillus; many media were tried with no avail, although many interesting results were obtained in relation to the growth of mouth-bacteria generally. (1) Mouth-bacteria grow best upon an alkaline medium; a series of percentages of normal  $\text{NaOH}$  was tried varying from 1 to 20 per cent; 1 per cent gave the best results, so we now add 10 cc. of normal  $\text{NaOH}$  per litre of broth, etc., after neutralization. (2) All mouth-bacteria flourish best when the medium contains gelatin, so that broth made with shin of beef is better than broth from beefsteak; and gelatin-agar better than agar. (3) The addition of a small percentage of potassium sulpho-cyanid does not prevent the growth of many mouth organisms, the mouth streptococcus often growing in 5 per cent of that salt. (4) The mouth streptococcus constantly outgrows other forms, and so on with many other minor points.

The first cultures of the bacillus maximus buccalis were obtained

in the following way: (1) Broth was inoculated from a mouth direct, the coverslip preparation showing the organism in question. (2) Cultures upon agar were made at intervals after the first three days, and (3) eventually plating from the impure culture obtained. So far a pure culture has not been obtained by plating direct from the mouth; the organism in common with the spirillum presently to be described evidently requires some time to adapt itself to the new environment. The above method is tedious, and better and more certain results are to be obtained by the method used for the spirilla. The organism occurs in all dirty and unclean mouths, and not infrequently upon the tonsil, although it appears to be present in the greatest numbers in mouths where a large amount of caries exists.

*Morphology.*—Thick jointed threads 1 to 1.5  $\mu$  broad, 10 to 20  $\mu$  long; some threads may be even longer than this, others curved and twisted, especially in old cultures on potato. The individual elements are 1 to 4  $\mu$  long but may be much larger, the ends are squarish or rounded; it stains by Gram's method and by ordinary dyes. With carbolic methylin blue, red granules often appear. In old cultures (four to ten days) the threads stain irregularly, especially with carbo. meth. blue; some of the unstained spaces appear to be vacuoles, others are highly refractile spores; these spores stain a deep red by Moller's method.

A twenty-four hours' culture on broth or agar is motile, especially the shorter isolated segments which have a twisting and irregular motion; some of the long threads are also motile and may move in a spiral manner. The flagella may be stained by Pittsfield's method; the maximum number appears to be six, two terminal and four lateral; there are generally only one or two lateral or isolated bacilli in the threads; I am not, however, quite certain as to the number of flagella. The bacilli do not stain purple with Miller's iodine, although at times portions of the rod stain a faint blue. In old cultures the rods appear granular, and many large, irregular, oval or round involution forms occur.

*Biological Characters.*—Aerobic and facultative anaerobic, *i. e.*, grows both in presence and absence of oxygen. It quickly liquefies gelatin. (a) *Stab cultures*: a distinct cone-shaped liquefaction in twenty-four hours. No liquefaction in depths, but good growth to bottom of stab; forty-eight hours lower parts liquefy. (b) *Streak cultures*: twenty hours, deep groove of liquefaction with whitish

flocculi in liquid. (c) *Gelatin plates*: twelve hours, whitish-grey, flat round colonies, 2.5 to 5 mm. wide, with slightly darker central spot when viewed by transmitted light.

Microscopically (1 in. obj.), irregular dentated edge, slightly yellow, with darker brown irregular center with feathery edge overlying the outer and lighter part which contains irregular fibres.

*Agar*.—Twelve hours, brownish grey streak with regular defined wavy edge; with a pocket lens the surface is distinctly granular, having the appearance of frosted glass—thick, easily scraped up with spatula. The bacilli grow out into long articulated threads.

*Broth*.—Twelve hours, granular precipitate with masses floating in fluid, no pellicle and little turbidity; twenty-four to forty-eight hours, more turbidity and precipitate, no pellicle. A pellicle may be formed later, three to five days, and on peptone water in about the same time. Hanging drop, mostly short thick bacilli distinctly motile but not excessively so. *Litmus Milk*.—Twelve hours, distinct acid reaction, color eventually reduced; no clotting in six days.

*Blood Serum*.—Twelve hours, slightly raised, moist, whitish growth; no further change in five days. *Potato*.—Twelve hours, thick and well marked, moist, raised, greyish growth; twenty-four hours, brownish-grey, hanging drop, motile. Soon forms spores.

*Spore Formation*.—In a twelve days' culture many oval or oblong highly refractile bodies may be seen, not staining with the ordinary dyes, and forming curious chains with the long axes parallel. On staining by Möller these bodies are stained a deep red, the bacilli blue. If some of the culture be suspended in broth and maintained at 70 to 75 deg. C. for half an hour the bacilli are destroyed, but the spores are not and develop on agar streaks in the usual way. A five days' culture on peptone water gives no coloration with pure sulphuric acid or on addition of sodium nitrate. No gas bubbles appear in gelatin shakes, whilst .05 gm. per cent of potassium sulphydric cyanid does not prevent growth.

In all unhealthy mouths, and especially in the early stages of pyorrhea the writer has observed vibrios, of both comma and spiral form; these are the well-known *spirillum sputigenum* and *spirocheta dentum*, and which so far have resisted all attempts at cultivation. The writer, after repeated endeavors extending over a period of more than two years and after many failures, has obtained a method by which these refractory organisms may be isolated,

although at present it is impossible to say if all the spiral forms met with belong to the same species; so far, however, all the cultures obtained, twelve in all, correspond with one another in their main characteristics. On the surface of alkaline potato gelatin the writer has obtained the spirillum five times from five consecutive cases. Three other cultures were obtained at an earlier period of the investigation, but as the method did not always prove successful it was thought better to defer the description of the spirilla until a method had been discovered whereby the vibrios might be grown with certitude. These conditions appear now to be fulfilled.

During the research many media have been tried, with varying degrees of alkalinity; media made with egg albumen as basis instead of meat extract, infusions of glands, saliva broth with different percentages of pot. sulpho-cyanid, mucin media made from snail mucin, vegetable juices, and many others. Three times a pure culture was obtained by the use of egg broth, made by adding four eggs to a litre of water, with 1 per cent of peptone and lactose and .5 per cent salt; the medium is then neutralized so that the albumin is converted into alkaline albumin in such a way that a slight trace of acid produces a precipitate. On this medium a slight growth occurred, and upon streaking on to saliva agar and then plating a pure culture was obtained. The spirilla will grow also for a short time upon mucin gelatin (2 snails to 100 cc. water) but soon die out.

The potato gelatin is made by extracting one kilo grated raw potato with a litre of water for two hours, and after adding gelatin and boiling two eggs are added (whites only), reboiled, neutralized and 1 per cent normal  $N_2OH$  added.

On this medium the spirilla grow in conjunction with other mouth-bacteria, among them *B. maximus buccalis* as mentioned above, and by adopting proper precautions a pure culture may be obtained. The method is the following: (1) Inoculations from mouth direct on to slanted potato-gelatin, development is extremely slow. (2) After three days a second slant is inoculated from any minute pin's point colonies which show spirilla; if the second tube shows growth there is little difficulty in obtaining a pure culture; on the other hand, plating from the first tube is generally successful, the point to be remembered is that the organisms require time to accustom themselves to the altered conditions of surroundings, but if left too long may be exterminated by the development of other bacteria.

On the gelatin plates at the end of four to five days minute, ill-defined, grey-white moist colonies are to be seen, the hanging drop showing distinct spiral motion, but on staining the spirilla are far from typical. Potato-gelatin streaks from these colonies develop slowly; in three days minute pin's-point colonies may be seen along the streak; even now these will not grow in the hot incubator. After a variable time, however, the growth is more pronounced, and on transference to agar at 22° C. a good development of beautiful spiral and comma-shaped forms appear at the end of twenty-four hours in the form of a whitish, raised, moist streak.

Potato-water, potato-agar, and potato-agar gelatin do not give such satisfactory results. On boiled potato streaked from the mouth direct spirilla, as well as *B. maximus buccalis*, may be found at the end of twenty-four hours, but a transference to even potato gelatin does not give satisfactory results. Large slices of potato in petrie dishes have also been tried with but poor results, it being extremely difficult to see the minute colonies on the surface of this medium.

Nettler found the spirochaete dentum in the pus from a putrid empyema. The author has also found the same organism in the pus from a diffuse suppuration following the removal of an upper second molar; the mouth of the patient in question contained many spiral forms, and a few were to be found in the pus of the drainage tubes in the face which did not communicate with the cavity of the mouth. The spirillum cultivated by the writer has the following characteristics: *Morphology.* Vibrio, occurring in young cultures as comma-shaped rods .1 to .3  $\mu$  in breadth, 1 to 2.5  $\mu$  long, with rounded, or pointed ends. In older cultures growing into well-marked spirilla, some composed of commas united in series, others spirilla with four or five turns without a break, very long threads are also met with; these are often much thinner (spirochaeta), the spiral forms are most common after forty-eight hours and best marked on broth. In old cultures curious swollen and twisted involution forms are to be seen; some of these are at the ends of the spirilla and commas and present a similar appearance to the forms seen in the mouth itself and not unlike flagella. Curious spherical bodies are at times to be seen in the course of the spirilla similar to the so-called arthrospores described by Hueppe in the cholera vibrio; spherical bodies are also to be seen with no spirilla attached. No endogenous spores have been observed. Stains with difficulty, best

with carbolic fuchsin, or carbolic spillers purple, or by anilin gentian violet after treatment with alcohol. In old cultivations the threads and spirilla stain badly and often have the appearance of chains of bacilli with an unstained interval between them. It does not stain by Gram's method. A twenty-four hours' broth culture is extremely motile, it often being difficult to observe under the  $\frac{1}{12}$  in. lens in the hanging drop. Upon staining by Pittsfield's method, or by *night blue*, a single terminal flagellum may be seen. *Biological Characters*.—Aerobic, facultative anaerobic, motile, liquefying, spirillum.

*Gelatin Plates*.—At the end of forty-eight hours, minute greyish white colonies, very much like streptococci, moist and flat. Liquefaction commences soon after.

*Microscopically* (1 in).—Brownish, round, or slightly oval, not granular, with darker, irregular central area opaque. Agar colonies similar, but less color and without darker area.

*Stabs*.—Cup-shaped liquefaction in four days, little fluid, the tube may often be inverted without the liquefied mass running out, white flocculi in liquid and at bottom. The rate of liquefaction varies somewhat in different specimens and is as a rule longest in cultures recently isolated.

*Streak*.—Groove of liquefaction in three days.

*Agar*.—Good growth in twenty-four hours; greyish, raised, moist growth, with well defined straight edge; colonies may, however, be separate and form grayish, round, smooth, defined patches, eventually becoming confluent. In *agar stabs* growth takes place to bottom of puncture but does not develop much; a film soon spreads over the surface. In three to six days a brownish buff color appears in the central and thicker parts of the streak. In old streaks on agar the surface may be raised into hillocks or be irregularly raised and wrinkled; the appearance on agar is extremely variable. *Blood Serum*.—Twenty-four hours, brownish streak with slight amount of liquefaction. Forty-eight hours little change, liquefaction extremely slow. *Litmus Milk*.—Twenty-four hours, well marked acid reaction, with well marked clotting in seven days, sometimes less. *Broth*.—Twenty-four hours, general turbidity and slight trace of pellicle. Seventy-two hours, well marked pellicle. A four or five days' culture on broth or peptone water gives well marked "cholera red reaction" with pure sulphuric acid.

Organism	Gelatin	Lit. Milk	Agar	Broth	Potato	Blood Serum	Colonies-Gelatin
<i>Vibrio cholera</i>	24 hours, no liquefaction; 48 hours liquefaction commencing	24 hours, slight acid; 48 hours, marked acid; 7 days, clot	24 hours, moist white layer, defined edge	24 hours, slight pellicle, fluid slightly cloudy; 48 hours, more pellicle	24 hours, no growth; 48 hours, growth; 3 days, faint growth	24 hours, yellow brown streak, slight liquefaction; 48 hours, similar	24 hours, pale yellow, irregular, coarsely granular
<i>Vibrio Metchnikoff</i>	24 hours, no liquefaction; 48 hours, liquefaction commencing	24 hours, slight acid; 48 hours, more acid; 7 days, clot	24 hours, moist yellowish white streak	24 hours, cloudy, with pellicle; 48 hours, more pellicle	24 hours, no growth; 48 hours, growth; 3 days, faint growth	24 hours, yellow brown, slight liquefaction, 48 hours, similar	34 hours, similar to <i>v. cholera</i>
<i>Vibrio Finkler Prior</i>	24 hours, well marked liquefaction; 48 hours, large deep liquefaction	24 hours, no acid; 48 hours, no acid; 7 days, no clot	24 hours, moist slimy layer, spreading over surface	24 hours, cloudy slight pellicle; 48 hours, more pellicle	24 hours, no growth; 48 hours, growth; 3 days, creamy yellow growth	24 hours, well marked groove of liquefaction; 48 hours, half liquefied	24 hours, minutely granular, yellow and yellow-white liquefaction
<i>Spirillum putogenum</i>	24 hours, no liquefaction; 48 hours, slight liquefaction	24 hours, acid reaction; 48 hours, more acid; 7 days, clotting	24 hours, moist grey white raised streak, center yellowish defined edge	24 hours, slight turbidity; 48 hours, more turbidity; 72 hours, pellicle; 9 days, clear fluid, wrinkled pellicle	24 hours, no growth; 48 hours, faint brown tinge; 3 days, well marked	24 hours, brownish layer, slight liquefaction, 48 hours, similar	24 hours, brownish, round and oval, not granular, with darker irregular center

*Potato*.—No apparent growth in twenty-four hours at 37° C. Two to three days 22° C., well marked, rich red brown coloration, moist and slimy. Involution forms and threads often formed.

The writer has compared this organism with Koch's cholera spirillum, and those of Metchnikoff and Finkler Prior. It is not unlike them in many respects, but has important points of difference. Like the *v. cholera* and *v. Metchnikoff*, it gives a well marked cholera red reaction, which is not given by *v. Finkler Prior*, and although it liquefies gelatin, does not do so with such rapidity as the latter organism; in fact, in recently obtained cultures little or no liquefaction occurs. Slight liquefaction of blood serum takes place, more like the effect produced by *v. cholera* and *v. Metchnikoff*. On litmus milk it produces more acid than *v. Finkler Prior*, and a clot is finally formed more like *v. cholera* and *v. Metchnikoff*. The appearance on broth varies but is not so rapid as either of the other three. The growth on potato occurs at ordinary temperature of room, differing from *v. Metchnikoff* and cholera, and is more rapid.

The cultures I am passing round illustrate these points. From the foregoing results the spirillum the writer has isolated appears to be a distinct species, and must be regarded as such; but that all the spiral forms met with in the mouth belong to this organism alone is highly improbable. At the same time most of the commas and spirilla are to be referred to the spirillum described, the evidence adduced being certainly in favor of this view.

In summing up, the conclusions the author draws from the various results set forth in this paper are these:—The filamentous forms occurring in the mouth are by no means therefore leptothracæ, and one of them at any rate has been conclusively proved to be a bacillus capable of spore formation and thread production, whilst other bacilli which space prevents me describing also produce thread-like forms. The *B. maximus* is also an organism whose relation to dental caries is important, both from its power to produce acid and the ease with which it liquefies gelatin.

*Spirillum sputugenum* and *spirochæta dentum* are to be found in inflamed conditions of the gums, and especially in pyorrhea, these organisms being forms of one variety whose cultures differ from other known spirilla, while the difficulty of obtaining pure cultivations is due to reluctance with which organism takes on a saprophytic existence, as well as the restraining influence of other organisms.

Finally both organisms, though they may exist in healthy mouths, are present in most profusion wherever inflammatory and pathological conditions are found.—*Brit. Jour. Dent. Sc., Sept. 1898.*

\* \* \*

**SWELLING OF SUBMAXILLARY GLANDS DUE TO THE PRESSURE OF A LOWER DENTURE.** By W. H. Dolamore, L.R.C.P., M.R.C.S., L.D.S. London. For some years past I have attended a lady about 28 years of age for bad pyorrhea alveolaris. When she first came to me the disease was already far advanced—indeed her more immediate cause of complaint was an abscess which had formed on the lingual surface of the gum in the neighborhood of the apex of the lower left lateral. Abscesses have from time to time reappeared and the disease itself has run its usual course, having perhaps more acute symptoms than is usually the case. The way in which a tooth firmly fixed, relatively speaking, and the gum around practically free from disease, became in the space of three months so loose and so bathed in pus as to need to be extracted (if one can use the term extraction for the lifting out of a tooth quite detached from its root membrane) is extremely suggestive that the disease was due to some infective organisms. The treatment that has proved of most service has been the use of sulphate of copper, abscesses when they developed being laid freely open. It was impossible to band the teeth so as to keep them firmly fixed on account of the objections of the patient to this course, and trying to secure them by lacing together with thin platinum wire caused so much periosteal irritation that the wire had to be removed. However, the treatment has at least served to keep the disease in abeyance, and I do not think that her teeth are more loose now than when I first saw her about four years ago, though of course she has lost the tooth previously referred to, which curiously was an upper bicuspid, though speaking generally the disease is more marked in the lower than in the upper jaw.

Seeing that she was deficient in masticating teeth in the lower jaw, having lost the first and second molars on either side, it seemed reasonable to suppose, quite apart from any other consideration, that the insertion of a denture would relieve the lower front teeth of some of the wear and tear of biting, and so perhaps help in preventing them becoming increasingly loose. I therefore made and inserted for her an ordinary bar lower. There was nothing to note during

the first few weeks that she wore this denture. It pressed in one or two places, but these having been eased the plate became quite comfortable. After however wearing it for a few weeks she noticed a swelling had formed under both the angles of the lower jaw. The swellings came somewhat suddenly, though she may not have noticed them while they were yet small. She tells me that they increased markedly in size after meals. She was going that day to the seaside, and being suspicious that she was suffering from mumps, consulted her physician, who assured her that this was not the case and advised her to leave out plate. This she did and when she arrived at her destination the swellings had completely disappeared.

It is curious to note that she is of opinion that her gums are usually worse when she is by the sea; this, of course, may be nothing more than a coincidence. She tried several times after this to wear the plate, but always with the same result—a return of both the lumps. On her return to town she wrote telling me of this, and when sending her an appointment I asked her to wear the plate for a few hours before coming to see me. This she did and I found the swellings above referred to; they occupied the region of the superficial portion of the submaxillary glands, had a defined margin, but were quite soft to touch and compressible. There was no sore place in the mouth, but the lower margin of the plate in the bicuspid region obviously reached down to the floor of the mouth.

Here I may note that the patient is very thin and has small bones. The depth of the body of mandible is less than usual. and a finger placed on the floor of the mouth can readily feel one placed over the mylohyoid muscles, the thickness of tissue between the two fingers being very slight. I cut away freely the lower margin of the plate, which she has worn since then without any return of the swellings.

There is no doubt in my mind that the swellings were due to the plate pressing on Wharton's duct, so impeding the flow of saliva from the submaxillary glands. That the lumps were due to the salivary glands becoming swollen is more or less proved by the fact that they became markedly larger after meals, and a glance at the course pursued by Wharton's duct shows that as it passes upwards, forwards and inwards beneath the mylohyoid muscle it comes at the anterior border of the hyoglossus muscle near to the floor of the mouth, close to the jaw in the bicuspid region; in very thin subjects but little tissue can cover it at this point, and pressure exerted

here would obviously obstruct its course. A plate is scarcely likely to exert this pressure save in patients with fragile lower jaws. It is possible that the tissues around the mouth of this patient may be in an irritable condition, for I cannot conceive that these can escape some degree of infection by absorption from the discharges which escape year after year in pyorrhea.—*Dental Record, Sept. 1898.*

\* \* \*

DENTIST'S POSTURE AT OPERATING CHAIR. By Eliza M. Mosher, M.D., Ann Arbor, Mich. Abstract of paper read at Tri-State Dental Meeting, Put-in-Bay, June, 1898. We have here the bones of the trunk, minus the arms, head and some ribs. The human skeleton consists of a pedestal, the pelvis, upon which is poised a long, slender, flexible column; to this and hanging forward from it are certain weights, the heaviest and largest extending forward, called the chest, made of ribs, cartilages and a sternum. Inside that circle are organs which increase the weight to the front and middle third of this long, flexible column. Then we have as other weights two arms hanging from it, connected from the scapula and shoulder blades. Then we have again a heavier or lighter weight in the form of the head, poised upon the top. Now to bring that coarsely-shaped structure into the upright and hold it there as it stands is rather a difficult matter, but you must remember that in addition to all this there are attached two columns, the legs, which by muscles can be swung out and placed underneath it, so that this disjointed structure is supported in the standing posture upon this foundation or legs.

The question arises, Is there any posture which we may call normal, one which is better than all others, one toward which the body should ever be turned? In order to find out whether or not there is, we immediately think of the two organs which are constantly at work, the heart and lungs. We say if there is a normal posture it must be one which gives to these two organs the largest space and least friction? If such a posture can be found, and in addition we find that all the other organs of the body are in their best place and are active, with the least friction and are filling up only their space, we say that position is the one which it was intended man should keep. If we come to study this structure we find that when the body rests firmly on the balls of the feet and lightly on the heels, when the pelvis is down in front and up behind,

carrying the gluteal weight high, in that position we find the sternum and spine as far apart as is possible for them to be without muscular action. In this position the heart and lungs have the best amount of space.

Commonly one arm balances another, but from before backward the body is not symmetrical. It was a difficult problem for me to ascertain where the balancing weights were placed until one day I discovered, while studying a little statuette, that upon the position of the pelvis depends the depth of chest. When a person stands his weight upon the heels and not on the balls of his feet, the chest is flattened and gluteal region lowered, and we have a lack of space for heart and lungs to do their work.

Remaining in certain postures continuously or using certain muscles repeatedly, the tissues on the one side become permanently short and the tissues which have been used become lengthened, and the intervertebral substance thins on one side and thickens on the other, so that the body attains a permanent shape in the position which it occupies most often, so that you and I, if our eyes are open to the subject, can with perfect ease tell what position any individual occupies in his work; in other words, the trade-mark of his work is built into his body.

The practical question which comes up this afternoon is this: The dentist, almost more than any other workman (if I may call him so), is obliged to occupy a position over his patient which is far from the normal position of the body, that in which it can do its best work. In making this study it has been very interesting to me to see the influence first on the spine. Fortunately the dentist is obliged to change from one foot to another, but he puts more weight on the right foot. It is his right hand which is steady, and he must turn his face to the patient. Perhaps you do not know what this does to the back and various parts of the body. From a study of it upon a good many individuals I find that the spine becomes permanently twisted outward and to the left, the ribs project backward on the right and recede on the left. At the upper part the twist continues at the top, so we have a rotation of the spine upon its own axis. Then you find that he has in addition to this a low left shoulder, which makes the two sides not symmetrical. The anterior wall of the body is shortened very materially. The space from the pelvis to the top of the chest is shortened and flattened, flattened

on the right and pushed out on the left. Now in that position the harmful effect is the influence upon the lungs, especially upon the young man who is not overly strong. The indoor life and flattening of chest is of course a great wrong. Using muscles on one side and not developing them on the other puts the body at a disadvantage.

The profession of dentistry has now become so important and is so influential it is bringing into it the best of our young men, and also women. I think that we should consider this matter of bad position and see if there is not some way to prevent it. If every dentist would exercise twice a day for 10 or 15 minutes, which should stretch out the short ligaments and shorten those which are getting long and filling out the body, a better state of health would be enjoyed, and the condition would be obviated, even though he is obliged to work in very bad postures.—*Indiana Journal*, Oct. 1898.

\* \* \*

**CARIES OF AN UNERUPTED TOOTH.** By W. D. Miller, D.D.S., M.D., Berlin, Germany. From time to time we read in the dental journals of rare cases in the domain of dental pathology, for the origin of which our generally accepted views and theories offer no satisfactory explanation. A case of this category was described by Dr. C. N. Peirce in the *Cosmos* for 1893, page 80, and as it has been cited as a proof of the untenability of the chemico-parasitical theory of caries, it will be of interest to study the question more closely. The case was that of a lady thirty-five years of age, who suffered severely from facial neuralgia on the left side. On examination Dr. Peirce discovered a tumor, about two centimeters in diameter, just above the tuberosity. On cutting into the tumor he came upon a hard substance, which proved to be the third molar. Upon further examining the cavity he discovered and removed three supernumerary teeth. The first of these teeth had six cusps, arranged in two parallel rows, the second had only four cusps, while the third resembled a bicuspid and was only one-sixteenth of an inch in length. "On the distal approximal surface of the second tooth was a well-marked cavity of decay, the carious action having penetrated through the enamel and well into the dentin." "The existence of true caries under these conditions," writes Dr. Peirce, "is extremely interesting from the fact that the teeth were completely covered by the soft tissues of the gums, and therefore entirely protected from any direct action of the oral fluids and food debris."

Dr. Peirce offers no further remarks upon this subject, but Hans Block (*Cosmos*, 1893, page 605) says: "This case, where true caries had destroyed an unerupted third molar, proves that bacteria are not even an essential factor for caries, as in this instance caries did occur on a tooth which never was exposed to external influences, hence also not to bacteria." This statement was ventured by Block notwithstanding the fact that neither he nor anyone else had examined the tooth with the object of ascertaining whether bacteria were really absent or not.

Professor Peirce kindly sent me the tooth in question some three years ago, but owing to various circumstances it is only now that I am able to report the result of its examination. The outward appearance of the cavity differed in nowise from any ordinary case of decay, and therefore need not be described. As the dentin was of course completely dried up, I laid the tooth in pure water for twenty-four hours in order to soften the carious portions, and then with a spoon-shaped excavator removed as large a piece as possible, from which I prepared sections by means of the freezing microtome and stained them by the Gram method. The microscopical examination revealed the typical appearances invariably seen in dental caries. The bacteria present were mostly cocci; bacilli were much less numerous. The characteristic iodine reaction could also be obtained, though it was not pronounced. Consequently, as was to be foreseen, the presence and action of bacteria were proven in this case as in all others. The question now arises, how did bacteria get there, and how could they without fermentable substances form the acids necessary for decalcification?

The thought naturally presents itself that even though the tooth at the time of the extraction was so covered by the gums as to be quite shut off from the oral cavity (Dr. Peirce does not seem to have made a thorough examination with reference to this point), it must at a former time have been accessible to the fluids of the mouth. This supposition was supported by the fact that the microscopical examination of the Nasmyth's membrane, isolated by means of hydrochloric acid, not only revealed the presence of discolorations in several places, but also showed the membrane to be invaded by bacteria of various forms. Furthermore the fissures were distinctly discolored.

These facts could be explained if the tooth had really never been

erupted, only on the supposition that a process of suppuration had existed in the neighborhood of the tooth, but Dr. Peirce does not mention anything of the kind in his report. All the facts point to the conclusion that the tooth in question must at some time or other have been for a considerable period exposed to the action of the secretions and food particles in the mouth. At all events it was far from being a case of "caries without bacteria."

Through the kindness of Zahnartz Hörstel of Plauen I was put in possession of a preparation which might be described in this connection. The two temporary molars and cuspid (right lower) of a seven-year-old child were extracted on account of a severe suppurative process at the roots. On removing the first molar the crown of the first bicuspid, which was wedged in between the roots of the molar, came out with it. Apart from the defective calcification of the enamel the surface of the crown was covered with black-green spots that had certain likeness to chronic caries. Closer examination, however, showed that it was only a case of discoloration, probably caused by some derivative of the coloring matter of the blood. Numerous bacteria, cocci as well as bacilli, could be demonstrated on the surface of the enamel as well as on the wall of the pulp-cavity, which would naturally be the case in a tooth long immersed in pus. Neither the enamel nor the dentin showed any changes indicative of caries.—*Cosmos, Oct. 1898.*

\* \* \*

**TEMPORARY SETS OF ARTIFICIAL TEETH.** By Dr. R. E. Sparks, Kingston, Ont. Read before the Eastern Ontario Dental Association. This question is frequently ignored by the dentist and consequently by the patient. Some practitioners believe that anything is good enough for a temporary set and that very little need be expected of it. These are they who lend or make a temporary set at a very small cost to the wearer. Patients who apply for permanent sets frequently say that they had temporary sets but never wore them. Some practitioners discourage the use of temporary sets, assuring their patients that by waiting a few weeks or months they can have a permanent set. So we see many wearers of artificial teeth with features distorted, gums flabby, flaps of unhealthy mucous membrane drawn down into the spaces left by absorption of the alveolar process after the insertion of the artificial teeth. I therefore ask the following questions: Are temporary sets of artificial teeth

beneficial? Why? How may they be made to give the wearer most comfort and benefit?

I take the ground that temporary sets are beneficial if made so they may be worn with comfort. First, the patient has the use of them for mastication, and this is most important to the individual with weak digestive powers, whether hereditary, or caused by continued overstrain by loss of masticating organs. Second, articulation. This is also a very important consideration to persons who sing or speak in public. Third, personal appearance. This is no small consideration to ladies, particularly those whose duties bring them much in contact with the public. Fourth, as a protection for the gums. Instead of temporary teeth being an irritation to the gums made sore by extraction of the teeth, they protect the gums from injury, from contact with hard substances of food and from the teeth in the opposite jaw, where such exist. Fifth, temporary sets fill the gaps where any extensive bridging is to be done, and where it may be necessary for any reason to postpone the operation. How may they best be made for the comfort and benefit of patient?

Where I can do so, in the case of upper sets I prepare to extract the molars and second bicuspid some weeks before I insert the temporary set. The greatest shrinkage takes place during the first few weeks. I leave the front teeth for appearance and use, where they are of any use for mastication. Ladies who occupy public positions object to being left without any teeth whatever. When the gums where the molars and second bicuspid have been extracted are healed and the sharp points absorbed, I extract the remaining teeth and take the impression at the same sitting. Where the teeth have been out for some time I allow rubber to pass up over the gums. Where the teeth have just been extracted I grind the tails of the artificial teeth to fit into the sockets left by the recently extracted teeth. This method anticipates the absorption of the alveolus. I have often seen temporary sets of teeth put in on this principle fitting as well after two or three years as others which had been worn two or three months, but had been put in on the ordinary principle. This is not always feasible where an anesthetic is administered unless it be gas, which may have to be administered two or more times. The advantages of inserting temporary sets upon this principle are many. It gives them a very natural appearance, looking as if the teeth had grown out of the sockets. After the outer wall

of the alveolus is absorbed the tails of the teeth set closely to the ridge. By this method one may with considerable accuracy take the impression and make the plate before extracting the teeth. To do so, cut the teeth off the plaster cast and make sockets sufficient to receive the tails of the artificial teeth. This is particularly appreciated in cases of partial sets, as the teeth can be extracted and artificial set inserted at the same sitting. But supposing for some reason chloroform be administered, the teeth must all be extracted at the one sitting, I would recommend that the gums be given a few weeks for absorption to take place. Then as in the other case I would have the artificial gum pass up over the ridge as far forward as the second bicuspid. The front teeth I would grind to fit the gum. That the tail may fit very closely I shave the cast where the teeth come in contact. The advantages of this method over having a gum of whatever material are various.

An artificial gum under the lips just after the teeth have been extracted will in most cases make the mouth appear too full. The ridge being prominent, the artificial gum of whatever made is almost certain to show, and as it is seldom feasible to use gum teeth, vulcanite is used and looks very unnatural. But a far more serious objection than these presents itself and forbids the general use of gums over the anterior ridge of the upper jaw in the case of temporary plates. If worn for any considerable time after the gums are absorbed the ridge becomes flabby and the mucous membrane of the lip becomes drawn into the space between the plate and ridge. Why this should occur at the front of the mouth and not at the back, and in the case of the upper and not in the lower, I am at a loss to say. In the case of temporary lower sets I usually cover the ridge entirely around with vulcanite and use plain teeth. The lower jaw being less prominent than the upper, the projection of lip caused by a thin layer of rubber is not so observable. The lower plate having to depend for retention upon its contact with the ridge, unlike the upper set which has the palatal contract, makes a gum all the way around more desirable.

The same care should be taken to secure a good articulation as in the case of a permanent set. As to the length of time it may be well to advise a patient to wear a temporary set, no rule will apply. I recommend the wearing of them as long as they are retained well and used with comfort, but warn the wearer against wearing them

after they become loose and uncomfortable. I always expect a well fitting temporary plate to be worn a year. By that time I expect the gums to be in a good condition for a permanent set. In the spring of 1875 I made a temporary set of teeth for a lady three weeks after having extracted her upper set. About two years ago I saw her and she was still wearing it with comfort. She had then lately broken off the central incisors, and said she would have them replaced by others on the same plate, as it was all right and she did not know what she might get next time, so she is probably wearing them yet.

The wearing of a temporary set overcomes the desire for a permanent set before the gums are ready for them, as is so frequently the case where temporary sets are not worn.

As regards the fee that should be charged for temporary sets, that could be no more regulated than could the fees for permanent sets or for any other operation. There is no reason why a temporary set of teeth should be made any cheaper than a permanent set, or that a temporary and permanent set should not be twice as much as either one, especially when extraction of the teeth is regarded as a part of the operation. But there seems to be a sort of retail and wholesale principle observed, that two sets shall cost less than twice as much as one set. This being the case I make it a rule to have the retail fee for the first set. This insures my making the permanent set if the temporary set has been satisfactory and patient be within reach. It insures me against loss if patient should get permanent set elsewhere.—*Dominion Dental Journal, Sept. 1898.*

\* \* \*

#### RESTATEMENT OF THE TOOTH-BLEACHING PROBLEM.

By Edward C. Kirk, D.D.S., Philadelphia. Read before New York Odontological Society, April 19, 1898. From a general survey of existing ideas upon the question of tooth-bleaching one cannot avoid the inference that our practice in this line of treatment is almost wholly empirical. Practitioners concern themselves principally with methods of procedure and the detail of minutiae which go to make up a given bleaching process, rather than with the scientific reasons why the process is applicable, or from a rational understanding of the conditions to be met. Hence it is that we hear more of the relative merits of given processes for tooth-bleaching than we do of the principles which govern their successful use. But the best

and most uniformly successful results in this as in any line of treatment can never be attained through the empirical study of clinical phenomena alone; a clear understanding of the underlying principles involved is essential to a rational use of methods based upon them, and is necessary to their successful application.

It is at once evident that we are confronted with a chemical problem, for in the successful application of a tooth-bleaching agent we have wrought an important change in the matter causing discoloration, so that it has lost its color quality and become white. Any change which affects the composition of matter so that its identity as such is destroyed is a chemical change. Our problem then is one of chemical reaction between a so-called bleaching agent and the coloring matter lodged within the dentinal tubules which shall so alter the composition of the latter as to render it colorless. A bleaching agent is any agent capable of effecting that result.

We may next consider the nature of the coloring matter, and afterward the means by which its color factor is destroyed. Tooth-discoloration may arise from many causes, but for our purpose this evening we will consider only the most common one, viz, that following death of the pulp and in which the source of discoloration is the hemoglobin of the blood. Hemoglobin is a complex proteid compound contained in the red blood-corpuscles. Traumatic causes, intense and sudden congestion of the pulp due to irritants, especially of arsenious acid or strangulation of the pulp, may cause a rupture of the stroma of the corpuscles, liberating their contained hemoglobin and its diffusion into the tubular structure of the dentin. The result is that the tooth becomes pink.

The difference in appearance between blood containing unruptured corpuscles and that in which the hemoglobin has been liberated is quite marked, and is clearly seen in the two flasks before you. One contains simply defibrinated blood, the other defibrinated blood which has been agitated with a small amount of ether. The latter when viewed even in thin layers by transmitted light presents the appearance of a homogeneous solution of hemoglobin in serum, while the former in thin strata presents the characteristic cloudy, granular appearance due to the presence of the unbroken corpuscles.

We may now test the reaction of our hemoglobin solution with hydrogen dioxid by staining a sheet of white blotting-paper with the hemoglobin and then applying the dioxid, and as you see, the

color is rapidly discharged, from which we infer correctly that in the very first stage of tooth-discoloration—the pink stage—the color is readily discharged by pyrozone.

The pink stage, however, rapidly passes and gives place to a brown discoloration, or at least some modification of a brown tint, varying in intensity with the amount of hemoglobin originally present. The change from the pink to the brown tint is due to a chemical alteration in the hemoglobin, which consists of its splitting up into hematin and globulin. This change takes place more or less rapidly and spontaneously within the tooth-structure. We can bring about the same result experimentally by the application of any acid to the hemoglobin stain on our blotting-paper, and by touching the stain with dilute hydrochloric acid you see the bright red color is instantly changed into brown. Upon making an application of pyrozone as before we find that the brown stain remains unaffected, and we infer that the brown stage of tooth-discoloration is relatively more resistant to bleaching by pyrozone than is the pink, an inference supported by clinical observation. The tooth under ordinary circumstances passes through color changes beyond the brown stage into a bluish or gray or nearly black color, and these changes in color are due to the progressive breaking down of the hemoglobin until the compound is reduced to its lowest terms. The final black or dark color is permanent, and is due to the formation of an unalterable compound of iron probably with sulfur, the iron being one of the original constituents of the hemoglobin and the element to which its various color manifestations are due. The sulfur which enters into the formation of the permanent final stain is derived from the protoplasmic element of the cellular structures of the pulp.

The resistance of the brown discoloration of hematin to pyrozone and other bleaching agents in greater or less degree renders the restoration of teeth so discolored often quite difficult. I have found, however, that the brown discoloration may be successfully removed by the prolonged action of either sodium or hydrogen dioxid, followed by an application of strong oxalic acid. The rationale of the process is based upon, first, the existence of iron as a constituent of hematin, and the formation of a soluble and practically colorless salt of iron with oxalic acid.

The permanence of the bleaching process is directly related to the

existence of iron as an element in the original coloring matter of the tooth, and which must either be finally gotten rid of or else so fixed by the application of certain agents that it cannot form new and colored compounds, if a permanent result is to be hoped for.

That iron is one of the elements of the hemoglobin stain is easily demonstrated, and that it is not removed by pyrozone but simply changed into a colorless combination, will be seen by applying the usual reagents for the detection of iron to the bleached stain on the paper before you, and there are at once shown the characteristic reactions of iron to potassium sulfocyanid, potassium ferrocyanid, and to ammonium sulfid. Teeth in early stages of discoloration and which contain coagulable matter in the tubuli should be treated to an application of strong zinc chlorid immediately after the bleaching by pyrozone, in order to coagulate and fix the white compound unalterably, or what is better, should be treated with a strong alkali—*e.g.*, sodium dioxid or Schreier's preparation—with a view to dissolving and eliminating the contained organic matter, aided by a thorough irrigation by hot distilled water. Where coagulable matter is not present resort must be had to a resinous solution, applied to the desiccated tooth until the dentin is fully saturated.

*Discussion.* Dr. Van Woert. Does Dr. Kirk believe or think that the galvanic current has any additional beneficial effect in connection with any of the agents he has used? Does it make the bleaching more permanent if it has been used cataphorically?

Dr. Kirk. That opens up another phase of the subject. It depends upon your method of operating. If it is a question as between the relative value of an ethereal twenty-five per cent solution of hydrogen dioxid or an aqueous solution of equal strength, I see very little difference. My statement, however, needs some qualification. It depends upon another thing, too, and that is, whether you desiccate the tooth in the beginning or whether you do not. Where I am going to use an ethereal solution I do not desiccate the tooth. Mr. Evans some time ago gave me the hint that hydrogen dioxid was very hygroscopic, that it was greedy of moisture; therefore I reasoned that it would be better to not remove all the moisture from the dentin, and in that way there would be a leading in of the hydrogen dioxid by reason of its affinity for water causing it to leave its ethereal solvent and to penetrate the tubuli. On the other hand, if I am going to use an aqueous solution, I would desiccate first and then use

the current. I get a better result cataphorically with aqueous pyrozone than I do without; but I cannot say I get a quicker action with the aqueous solution used cataphorically than with the ethereal solution used without cataphoresis. Where I need an aqueous solution I would use the current.—*Dental Cosmos*, Sept. 1898.

\* \* \*

CLAY AND PLASTER MODELING APPLIED TO CROWN, BRIDGE AND PORCELAIN WORK. By J. H. Prothero, D.D.S., Chicago. Read before Odontographic Society, May, 1898. The use of clay in crown and bridge work may not be apparent at first glance, because in the actual process of crown and bridge construction it is used only in the production of dies and counterdies for swage work; but when we consider the pliability and ease with which clay can be molded into desired forms, its utility as a means of developing artistic talent and of enhancing the powers of observation becomes appreciable, and for this reason it is especially valuable to the dentist who desires to do really fine and artistic crown and bridge work.

The object of this is to call attention to the value of clay modeling as a means of developing the artistic talents along specialized lines. For those who cannot avail themselves of the services of an instructor a few simple directions may be of benefit. Materials needed will be a few pounds of composite clay and two or three modeling tools. They should be simple in form, shaped somewhat like the finger but flattened on the sides. These, in addition to the fingers, will be all the tools needed. The fingers really do most of the work, while the tools aid in making it a little more definite.

A convenient size to make a model tooth would be from one and a half to two inches across the occlusal surface. The model used as a pattern should be a natural tooth in as perfect a condition as possible. This can be set in a small piece of clay in such a position as to present the occlusal surface directly toward the modeler. Outline this surface of the tooth, marking the grooves in their proper relation, then with the tool remove the clay along the sides of the groove, and in this manner produce the slope of the cusps, being careful not to lose the proportions the grooves have outlined. When this surface has been molded into proper proportions the position of the model tooth can be changed and one of the surfaces produced, and so on until the entire crown and roots can be developed if so desired.

In order to get the best results a tooth should be modeled a number of times, until its form and detail are familiar and can be produced from memory. This can be done by alternation, using first the natural tooth as pattern, then modeling the same from memory and comparing with the pattern tooth. The first efforts will naturally be crude, but continued application will accomplish results both pleasing and satisfactory.

Black's Anatomy is a valuable help in this work, because it gives a thorough, detailed analysis of each individual tooth, and of each and all the surface markings, and can be used in conjunction with the natural teeth to very great advantage. The following description of the occlusal surface of the lower first molar is taken from this work, and who could not, when modeling this surface, approach more nearly the ideal after reading such a description: "The outline of the occlusal surface, when seen in a line with the long axis of the tooth, is trapezoidal, with the buccal marginal line the longest. The buccal angles are about equally acute, while the lingual are equally obtuse, and all more or less rounded. The buccal margin is convex, but made irregular by two buccal grooves. The lingual margin is nearly straight, but sometimes slightly concave, or notched in the center of its length by the lingual grooves, but more generally it is slightly convex.

"The occlusal surface has five developmental grooves—the mesial, buccal, disto-buccal, lingual and distal—which divide it into five developmental parts, or lobes. These are the mesio-buccal (a), disto-buccal (b), mesio-lingual (c), disto-lingual (d), and distal (e) lobes, each bearing a cusp of the same name. The mesial groove (n) runs from the central fossa over the mesial marginal ridge to the mesial surface. The *buccal groove* runs in a deep sulcus from the central pit to and over the buccal marginal ridge to the buccal surface, and divides the mesio-buccal from the disto-buccal cusp. The *disto-buccal groove* (p) also runs bucco-distally from the central pit over the buccal ridge, more or less near the distal angle, as the distal cusp is large or small. It divides the disto-buccal lobe from the distal. The *lingual groove* (s) runs from the central pit, in a deep sulcus to and over the lingual marginal ridge, onto the lingual surface and divides the two lingual lobes. The *distal groove* (r) runs distally over the distal marginal ridge, and divides the disto-lingual lobe from the distal. The mesial and distal

grooves form a line traversing the whole extent of the occlusal surface, from mesial to distal, in the center of which is a V-shaped deflection, with its point to the lingual, the base receiving the point of the triangular ridge (i) of the disto-buccal cusp. In most examples the *central fossa* occupies all the occlusal surface within the circle of the summit of the marginal ridges.

"The occlusal surface of the lower first molar has five cusps, one on each of the five lobes, three on the buccal marginal and two on the lingual marginal ridge. Usually these are not so high and prominent as the cusps of the upper molars. The *mesio-buccal* (a) is the largest and strongest of the buccal cusps, and occupies rather more than one-third of the buccal marginal ridge. The disto-buccal cusp (b) is of less extent from mesial to distal, but has a longer triangular ridge, though not so high, which ends in the point of the V-shaped deflection of the mesial and distal grooves. The *lingual cusps* (c, d) are about equal in size and height (perhaps the mesial is a little higher on the average). They have strong triangular ridges (k, l) which terminate in the angles formed by the junction of the lingual with the mesial and distal grooves in the central pit. The *distal cusp* (e) occupies the distal portion of the buccal ridge, and forms the disto-buccal angle of the occlusal surface. It is the smallest of the five cusps and varies most in its relative size. It is the distinguishing mark of the lower first molar, being but rarely absent in that tooth, and never present in the lower second molar."

In order to preserve the modeled teeth in as permanent a form as possible a description of the method is here given: Oil the outer surface of the clay tooth, and after making a mix of plaster sufficient to cover a surface about four inches in diameter and an inch in depth, press the modeled tooth into the plaster far enough to get the entire outline of the occlusal surface. The plaster is now allowed to harden, then the upper surface is smoothed, notched in one or two places, varnished, and another mix of plaster applied to one-half the circumference of the model, building it in such a way as to leave the margins square. When this plaster has set the margins are varnished, and the last piece is completed by building plaster on the base and against these margins and the clay model. The three parts can easily be separated, the clay removed and the inside of the mold varnished, after which the matrix can be filled

with plaster. When the sections are removed the plaster tooth can be trimmed and the piece kept for a pattern.

A little time devoted to modeling the various teeth and reproducing them in plaster will soon give a set of working models that will be extremely useful in carved plaster cusp work, and for cusp and contour work in porcelain art. *Clay modeling*, specialized to meet the wants of the dentist, may be considered as a sort of technique training, and *plaster modeling* a practical application of the knowledge gained from clay to the actual processes of crown and bridge construction. The manner in which it is usually manipulated is as follows: When a molar or bicuspid band has been properly fitted to the root of the tooth, the impression taken, molds procured and the case mounted on the articulator, the occlusal surfaces of the opposite teeth should be varnished, the band filled with plaster and the articulator closed tightly. This will give an accurate impression of the surfaces against which the cusps of the crown must strike. Now with the knowledge one has of the forms of the cusps and the location of the grooves on the occlusal surface, cusps can be carved in the plaster corresponding to the occlusal conditions. The margins of the cusps must be carved even with the inner side of the band to compensate for the two thicknesses of gold that form the cusps, and which is conformed to the outside of the die.

When the carving of the cusps is completed, the band with cusps is removed and pressed into moldine and a die of fusible metal obtained. The details from here on are familiar to all, so will be carried no farther.—*Review, Oct. 1898.*

\* \* \*

ORIFICIAL IRRITATION IN RELATION TO NEURAL DISTURBANCES. Presented to Section on Neurology and Medical Jurisprudence, at forty-ninth annual meeting of American Medical Association, June 7-10, 1898. By Dr. Geo. V. I. Brown, Milwaukee, Wis. It would seem upon consideration that many operations brought forward by the gynecologists during the last few years for relief of so-called reflex pains and other nervous disorders, particularly neuralgia and migrainoid headaches, have not given the relief that was promised for them. The same is undoubtedly true to a considerable extent in regard to the rectal surgeon's efforts, and notwithstanding the fact that deviating septa and hypertrophied turbinates have freely given off their offending portions, there still

remain many who suffer constantly without a hope of relief; and in directing your attention into a new channel with regard to etiology and treatment of these conditions, I would urge the fact that, with a high nervous organization and free distribution of nerve-supply quite as complex as that of the other orifices referred to, the normal mouth has thirty-two teeth as additional predisposing factors, each with its own separate nerve-fibers from the wide-spreading carrier of sensation—the trigeminus. In addition to these connections each root is surrounded by a highly vascular peridental membrane, also in close connection with the blood and nerve-supply, making it not unreasonable to suppose that all these taken together would offer a very frequent source of irritation. Considering also the fact that through carries the pulps of these teeth and the nerve elements they contain are often exposed directly to external irritants, the etiologic factors, particularly with affections within the range of the direct nerve-supply through which they carry the sensation, ought in a large number of cases to be found to be within the oral cavity.

During the last few years my efforts have been directed to the study of certain peculiar forms of trifacial irritation, particularly one form of which little or nothing in the way of description seems to be extant in the literature of the subject. Without attempting to go into a general or even a partially detailed description of the various possible irritations from within the oral cavity, I desire to treat of what I have found to be a very common associate of neural disorders. It is a noticeable fact that in the mouths of all those so affected, wherever the natural teeth remain, their occlusal surfaces show that constant grinding and rubbing has abraded them, through the extreme pressure brought to bear during the paroxysms—if the pain be paroxysmal occurring in an intense nervous state—the result of hours of painful suffering or other like conditions. This has frequent mention by writers as noticeable among those who suffer from such disorders, but in no instance do I find where an author has thought fit to reverse the order of things and make the habit of the jaws, which is responsible for this condition, one of the etiologic factors in bringing about the disease, rather than a result, as it is generally held to be. Last year I described this hyperkinetic condition of the muscles of mastication and explained how irritation of the brain-centers governing these muscles, whether as a symptom of other neural disturbance or vice versa, would produce the same

result, namely, an irritation of the peridental membrane surrounding the roots of the teeth, and how through their apical foramina this irritation might be communicated to the many branches of the nerve, after which, as is well understood, the point at which that result expressed itself in pain, muscular spasm, tenderness of neuritis, hyperesthesia, anesthesia, or whatever the effect might be, could be reflected anywhere along the path of the nerve among its associates. Certain forms of this peridental inflammation and the resulting pain are quite familiar to dentists, but that there was grave trouble frequently caused by other forms of this affection, with which neither they nor physicians were commonly familiar, I have long been satisfied, and in the paper referred to I described a number of cases of extremely aggravated pain in the head and face which were cured or to a considerable extent relieved at my hands by the simple method of grinding the crowns of the particular teeth affected in such a manner that they could no longer be brought together. Since the writing of that paper, however, another form of this particular trouble has come to my notice in several cases, with symptoms such as are commonly ascribed to reflex expressions of uterine diseases.

Through the pterygoids a lateral grinding motion of the jaw of man takes place, which if pursued at night is easily noticed, and usually attention is called to it. If, however, the masseter and temporal muscles are called into unusual activity, the result is that the jaws are pressed firmly and tightly together, with a force varying in individuals from 200 to 270 pounds. With the jaws closed normally and the occlusion perfect, this force would be comparatively equally divided among the whole number of teeth. If, however, as usually happens in these cases, the jaws be shifted a little to one side or slightly forward or backward, then certain portions of individual teeth are brought together, and they alone must bear this tremendous force. Ordinarily the membrane surrounding the root is capable of withstanding a considerable amount of pressure for a considerable length of time. But by the continued application of this pressure, especially when weakened by other more general conditions, as of circulation, or otherwise, this power of resistance becomes impaired, and then one of two things must result—either a local disturbance made manifest by elongation of the tooth and soreness to pressure, a not generally serious affection, accompanied sometimes by localized

pain, usually comparatively easily remedied, or as I have believed, a direct communication of this irritation to the larger nerve trunks, to be by them carried to other parts. It has been recently proven that the old idea—as given in Gray's and other anatomies—of a direct communication of artery, vein and nerve, from the apical foramen to the main trunk of the nerve, passing along the jaw, is generally if not always incorrect, and that there is a more complex nervous connection with nerve filaments extending directly from this membrane to the main nerve supply, and this scientific histologic demonstration is directly in line with my own clinical observation, because it explains at once what I believe I have demonstrated to be true: that any or all the nervous symptoms generally recognized can be the direct result of peripheral irritation through this periodontal membrane. We are all familiar with the much-written and widely understood neural disturbances consequent upon eye-strain, but whoever heard of neurasthenia, hysteria or neuralgia resulting from jaw-strain, and yet this is exactly what does occur. If the use of certain muscles and the straining of those muscles can cause neurotic symptoms through irritation of the optic nerve-supply, why cannot the continued application of hundreds of pounds of force directly to certain other branches of the nerve through which sensation is transmitted do so equally with the other part? This theoretic explanation is, I believe, borne out quite fully by the following cases:

*Case 1.* Mrs. ——— complained of a general debility, loss of strength and poor circulation, and suffered intense pain at rather short intervals which finally became shorter until the pain was almost continuous between her eyes at the base of the brain and in the vicinity of the ear upon the left side. Three operations by gynecologists, who had mistaken her symptoms for reflex pain due to some womb disorder, left her rather worse than better. The treatment of certain inflamed conditions of the pulps of her teeth and maxillary sinus, and a correction by grinding the surfaces of tooth crowns giving evidence of receiving rather more than their share of the wear and tear, has given her, at least for the few months past since the operation, complete relief. *Case 2.* Mrs. ———, a very great sufferer, pain in eyes, back of head, which during severe paroxysms was severely felt also in the back, arms and leg, had become almost a hopeless neurasthenic. The birth of the last of

her five children was coincident with the onset of the severe symptoms and naturally led to treatment for laceration and endometritis, but without result. The abraded crowns of several teeth and the set expression during pain facilitated diagnosis; the treatment applied was to grind the occlusal surfaces of the affected teeth until they could not meet in occlusion, and treatment of pulps of the teeth that were irritated, resulting in complete relief from pain and a generally improved condition.

The cases were reported in the paper before referred to, one in which hyperesthesia of the lower lip and chin was instantly relieved by the extraction of a bicuspid tooth of a woman who had been treated, as she said, "for falling of the womb"; and another, a girl about 17 years old, whose extreme suffering for about eighteen months was finally relieved by grinding down certain teeth, irritated by grinding at night, found to be the probable result of sexual excitement as shown by a history of the case.

Many similar instances might be recited in which the symptoms of pathologic oral conditions have been confused with those of the eye, ear, nose and rectum, as well as of the vagina and uterus, but the present purpose is chiefly to call attention to the fact that this habit of the muscles of the jaws is of extremely common occurrence—in fact, nearly always an active feature of nervous states—for if caused, as sometimes happens, by overstimulus of the centers controlling those muscles, the result of some etiologic excitement elsewhere, then the effect is simply to increase the severity of symptoms; on the other hand it may be the irritant and solely responsible, but in either case the simple attention necessary to correction of the difficulty is a matter of first necessity in the treatment of a large majority of sufferers from functional and other disorders of the nervous system.—*Jour. Am. Med. Assn., Nov. 12, 1898.*

ADENOID VEGETATIONS.—G. Zimmerman attributes the etiology of recurring pseudo-croup to adenoid vegetations, and states that in his experience extirpation always cures the croup. . . . Bilhaut also emphasizes the frequency of curvature of the spine, scoliosis, kyphosis and lordosis in children affected with adenoid vegetations, and has observed all these troubles vanish after their removal. He claims that this should always be the first step in the treatment of any defective development of the spine or thorax. . . . Lauffs recently reported the cure of a distressing case of prolapsus ani in a boy of five, cured by removal of adenoid vegetations.—*Munich Med. Woch., July 12 and 18, and Vienna klin. Woch. July 14.*

## Letters.

### NEW JERSEY LETTER.

*Editor of The Digest,*

NEWARK, November 19, 1898.

MR. EDITOR: On the evening of Monday, December 19, the Central Dental Association will hold a meeting which we think will become memorable. At this time Dr. A. C. Hart of San Francisco, well known as one of the leading men on the Pacific coast, will read a paper on "The Positive Prevention of Decay." Dr. Hart has been working on this paper for the past ten years, and the Central Dental Association should feel proud to have the result of this labor first given to the profession through them. We have been given to understand that the paper will controvert several theories advocated by Dr. J. Leon Williams of London. A number of men prominent as microscopists and histologists have promised to be present to discuss the question.

The essay committee of the New Jersey State Dental Society has for its leader the veteran worker in dentistry, Dr. C. S. Stockton, who is ably assisted by Drs. Sanger and Riley. We bespeak for the meeting next summer eminent men to read papers and discuss them as well.

After the letter of Dr. Essig in this month's issue of the *Cosmos*, many New Jersey dentists are anxiously waiting to see whether the committee on colleges of the National Association of Dental Examiners will not refute some of his statements and bring forward the proofs.

The vice-chancellor of New Jersey has issued an injunction against the tooth-paste company that succeeded last summer in surreptitiously obtaining a copy of the report of the committee that recommended the preparation. A summary of the grounds on which the injunction was issued are as follows and will bear careful thought: The report was read in meeting of the society, but was not given out as public property, remaining the exclusive property of the society, the same as the literary work of an author would still be his property, even though he should read it to an audience invited to hear it, or just as a play is the property of its author under the same conditions.

The copy of the report was not obtained therefore by or through

any permission of any member or officer of the state society. It was proven in the argument of the counsel of the state society that the report was not given out as public property, and that therefore no one outside had any right to publish or in any way make use of any portion of said report.

The defendants failed to prove a single point that they advanced, and the vice-chancellor issued an injunction restraining them from using the report.

Yours fraternally,

HORNET.

### NEW YORK LETTER.

*To the Editor of the Digest,*

NEW YORK, Nov. 22, 1898.

MR. EDITOR:—Bees swarm in June, and when hornets swarm in October something has gotten into the hornets' nest. From all the buzzing it looks as if there were serious doubt just where they will light.

It seems as if someone took a delight in sending dirty linen to Omaha for a washing, and then hung it out in some of the journals to dry. New Jersey and Washington seem to have had *special mention* at the national meeting, and we quite agree with "Oriole" concerning the Washington affair.

The latest scheme is a national body with a fund, scientific investigations to stand on their merits, and doubtless a "professional" organ. Every organ must have a crank (journal). January will unfold what is in the air. Note the thirty-first anniversary of the New York Odontological Society. A program is announced for a double session that gives promise of unusual interest. Dr. Williams coming again across the ocean in midwinter would indicate that he has something prepared which will attract all scientific men. It is easy to listen to true scientists, for they are not boyish. "When I was a child I spoke as a child, but when I became a man I put away childish things." This is very applicable to dental societies.

It is announced that Dr. Williams will put his slides into the hands of any and all histologists possible before he reads his paper, thus giving them a chance to prove or disprove his claims. Nothing could be fairer.

Thirty-one years seems a good while ago, but we remember very well the formation of the Odontological. It has had a most interesting history, and taken all in all we do not think any other society

can make a better showing. As it has been, so it should continue to be a representative body of greater usefulness than ever.

We do not quite understand the real purpose set forth in the coming meeting, but it is becoming apparent that if we are to take advanced ground there must be more unity than has been heretofore manifested. A national organization which can come up to the standard of the age will have to pull together intellectually and financially. More plans have been projected, and we think it due to the pride of professional aspirations that they be attempted.

Dr. Head of Philadelphia displayed his articles of vertu before the November meeting of the Odontological, following with a paper. He showed decided skill in his clinic, placing a corner on a superior central incisor. A large attendance gave full approval, and if all could obtain the same results as Dr. Head has done, porcelain filling would be a success. His use of very thin and exceedingly soft platinum proved its value as a matrix. A thickness of from one-thousandth to three-thousandths of an inch could be secured, and the toughness and ability of platinum to stand any amount of heat made it more valuable than any other metal.

Dr. Littig advocated placing the body partly in the matrix, and while it was in position in the cavity by pressure with spunk or paper forcing out all the moisture possible. This facilitates the removal of matrix from cavity and seems a good idea.

Something new is an ethereal solution of cocain for obtunding sensitive dentin. It has just been put on the market by McKesson & Robbins, and operates by thermal action and very rapidly. Many of the most progressive men in New York highly commend it.

We learn that Dr. C. D. Cook of Brooklyn, father-in-law of Charles Tomes of London, is seriously ill with typhoid pneumonia. Dr. Cook has been one of our best known dentists for nearly a half century, and all will hope for his speedy recovery.

Cordially,

NEW YORK.

### BALTIMORE LETTER.

*Dear Digest:*

BALTIMORE, November 19, 1898.

In a recent conversation the editor of a dental monthly gave his reasons for having criticized those who write under assumed names. As a class the editors of our journals are bright, entertaining and clever men; they do much to mold opinion and create sentiment

among our professional brethren; they are entitled to no little respect for their ardor and enthusiasm, and this we cheerfully accord them.

However, when a man assumes the editorial function of a journal which is published by a corporation, great or small, his dealings with that corporation must conform to certain definite and fixed regulations; he must of necessity become a party to a contract, because all business is done that way; his identity is as distinct as that of the publishers; his successful conduct of the journal evidences his fitness for the place, brings credit and shekels to the company, and incidentally extends and enlarges the scope of the editor's influence. His relations with his partners, the publishers, cannot be overlooked, and must for all time involve those who subscribe for and read his journal, even though he has *carte blanche*.

It is not strange that men of the most independent mold, of superior judgment and good taste, grow to look at things professional through this business contract. What fool would tear down the house in which he lives, unless to build a better? And certainly no suicidal mania has prevailed among our dental editors of late. Indeed it would be a thing quite unnatural, and disturbing to one's sense of the fitness of things, to see a vigorous editorial in a dental journal condemning the publishers or antagonizing the publishers' interests.

Thus it is that the corners are rounded off of what is written, abuses are palliated or overlooked, subscribers and advertisers are everywhere placated or smoothed down. Perfume and incense alone escape from the editor's cozy corner, the approaching millennium is crowded to the forefront, while the smile of the successful salesman wreathes the editor's handsome face.

This is all very pretty and we don't find fault with it; indeed, we think the world is better and happier in spells when it is led to forget the sin of Adam and the vices of his descendants. But if there is to be real progress there must be seasons of investigation of a sort not provoked by optimistic editorials. Attention must be called to abuses, so that they may be corrected. It seems to the writer that an impetus in this direction can best be given by a wind that bloweth where it listeth, or by a little bird that tells its story and then is nobody. What man so vain or self-opinionated as to think that he could in his professional capacity undertake to regulate even the

dental community in which he lives; yet, in the capacity of a modest little bird he can point out the ideal and condemn the vicious, without even for a moment entertaining the idea that in his ordinary associations he has any right to pose as anything but a very plain and humble member of his profession.

Then again, we would like to ask our friend, the editor, if precedent has not established a license for writing under a *nom de plume*? Have not our ablest writers, most sensitive, high-toned and best men resorted to this practice in all ages? Have not reforms, social and political, been the result of such efforts? Much of course depends upon the motive; and when it can justly be said that Oriole's letters are written to gratify private ambition, to indulge in expressions of personal animosity or unfriendliness, or to further in any way his individual interests, then will the writer discard Oriole and appear in person with his explanation.

\* By the way, it is not a little amusing what wide guesses are made as to Oriole's identity. A friend tells us that he has received several letters and been personally charged with being Oriole. Another says that his writings have been submitted to experts and compared with Oriole's letters to prove his responsibility, and worst of all, the experts were certain 'twas he. Ha-ha! guess again.

In our last letter we hinted at an error which some of our friends have allowed themselves to be enticed into; it is this. A certain patent medicine company, seeking the endorsement and recommendation of the dentists, conceived the idea that if the dentists themselves had an interest in the profits of the concern manufacturing the secret preparation they would more unfailingly recommend it to their patients. The agent of the concern was therefore sent through this section with blocks of stock, to be sold or given away to the dentists in proportion to their ability to recommend the nostrum. And who would have thought it? Instead of kicking the representative out of their offices, many of our best-known men accepted the stock. The list of names was exhibited to Oriole with much pride by the peddler and was sorrowfully scanned. Washington, too, was well represented. We would like some of these men to say publicly whether they are willing to have their clients know that they have a business interest in this preparation; that they don't know anything of its manufacture or of what it is composed, or in what proportions, but they are assured by the manufacturers that it

is good for all dental ills. As a rule, men of our profession are the most gullible creatures on the face of the earth; in the words of a canvasser, given to me in confidence: "They are easy meat." Take Oriole's advice: don't receive as a present or buy any stock that is offered in this way. Put your money in a savings bank until the pile is large enough for legitimate investment; and don't accept presents that will involve you in dishonor.

Our board of examiners is in session and from reports are laboriously brushing up on what is taught in the colleges. We think if the present board should be retained for ten or twelve years they would be well qualified for their duties. "Civil service" should be practiced here; a green man who is unaccustomed to study and teaching ought not to examine students. Then we don't like the idea of holding the examinations in the dental colleges. The fees are ample; let the examiners hire a hall and not involve their work with the colleges or college men.

Cordially,

ORIOLE.

---

DANGERS OF THE NASAL DOUCHE.—Lichtwitz deprecates the routine prescription of the nasal douche in all cases of hypersecretion of the nasal mucous membrane. Irrigation is called for only when the nasal fossa require clearing of pus and crusts, for instance in idiopathic ozena. This affection is mainly limited to the nasal fossa properly so called, and irrigation is in such a case the most fitting form of procedure. An ordinary syringe or enema syringe with suitable nozzle should be used. In all other nasal affections irrigation is inadequate or useless; it is even dangerous. Repeated flooding of the mucous membrane may give rise to olfactory lesions. Antiseptics are highly injurious and pure water is badly borne; the physiologic solutions of sodium chlorid, sodium bicarbonate or sodium sulph. are the only harmless liquids. In numerous cases irrigation has caused the sense of smell to be temporarily or permanently diminished or lost. Distressing frontal or occipital headache may result, owing to the liquid passing into the sinuses. The injection of irritating liquids may even set up inflammation of these cavities. The most skillful and careful irrigation is insufficient in many cases to prevent the resulting headache. A very grave complication is the penetration of the liquid into the middle ear, suppurating otitis media occasionally supervening. In acute coryza, especially in children, douching should never be practiced. In one such case known to the author mastoiditis followed irrigation of the nasal cavities. The predisposition to otitis is increased after retronasal operations, in particular after ablation of adenoid vegetations. For eight years the author has given up all irrigation after pharyngo-tonsillotomy, and during that period has met with no case of post-operative complication.—*British Medical Journal*.

# The Dental Digest.

PUBLISHED THE TWENTY-EIGHTH DAY OF EVERY MONTH

At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

---

## Editorial.

### PROFESSIONAL VERSUS COMMERCIAL ASPECT OF DENTISTRY.

The question of a higher standard of education for those entering our profession has been under constant discussion for years, and this agitation has compelled the College Faculties' Association to effect reforms of various kinds which have been steps towards increasing the requirements, but some more radical move is now needed.

There is, however, another element predominating in the profession at this time which is quite as dangerous as ignorance—the commercial aspect, and on account of this being so prominent the professional aspect is almost smothered in everyday practice. The question of how to get hold of money is so prominent in the minds and actions that all other features are lost sight of. On this account, when the patient presents himself the first consideration is, how can the greatest amount of money be secured? When as a matter of fact the first consideration should always be, what is for the best interests of the patient?

We believe this principle is so often lost sight of nowadays that the profession is constantly being brought into disrepute, and in the long run the operator is the loser both in manhood and financially.

This does not end here. The desire to acquire money leads individual practitioners to adopt many questionable methods for the sake of securing business, so that they often lose sight of propriety and the proper treatment and rights of their competitors. The strictly professional man must therefore view the existing conditions with many misgivings for our future standing, for it cannot be denied that as a profession we are on the downward grade. This demoralization is far-reaching, and to get at the remedy we must first seek for the causes.

The first question which we will consider here is the extreme poverty of a majority of the dentists in the United States, and from this

standpoint the dental profession as a whole is a pitiable object. With here and there an exception the individual dentist is without accumulation of property, and in many cases is in debt and unable to meet promised obligations, not knowing from month to month where the money is to come from for current expenses. We believe this description not overdrawn, and if true, think how demoralizing and detrimental such a state of affairs is to real success, causing as it must a warping of judgment, hindering proper management of the case in hand, and too often leading to questionable methods.

Admitting that the depression in all lines of business during the last five years has lessened the income of the dentist as much as that of any other class, and has had much to do with increasing the impoverished condition of the profession; and granting that the improvement in business will to some extent remedy this, back and independent of it all are conditions which are detrimental and must keep us as a body impecunious. In the first place the expenses of the dentist are out of all proportion to his income, but we cannot discuss this feature here in detail. Our next proposition is that there are more practitioners than can secure such remuneration as good dental services deserve, and this overcrowding is on the increase.

Each spring when the classes are graduated and given diplomas authorizing them to practice, the blunt reality of earning a living confronts them. Most students have in the three years' course spent all they had accumulated, and in many instances have borrowed the necessary funds to meet the expense of their college course, so that the question "what next?" must be settled speedily. Having located in a good town, which however is full of dentists—in fact it has seemed impossible to find a location where the demands were not already fully supplied—the next thing is how to get patronage. Since much time has been spent in the college clinics observing methods of practice, the plan of conducting the infirmary has been noted, and it is but natural that the graduates should adopt similar methods, even though such sometimes are not on the most dignified and highest professional plane, and in a private practice would be termed quackery. Is it any great wonder that each year a larger proportion of the profession are adopting commercial methods instead of professional? And is it strange that a discussion of the question whether we are a profession or a trade is being forced upon us?

We have briefly described a condition which cannot be disputed. It would be much pleasanter to draw a different picture—one of a truly professional body—but this cannot be done, for not more than one-fourth of those practicing dentistry can be called a part of the profession or are known in it, and three-fourths are entire strangers to the other fourth and the work they are doing. A great reform is needed, and from whence will it come? Not, we fear, through the present Faculties' Association, for there are so many schools now in existence that large classes are too important a factor, since most of the institutions are dependent upon matriculation fees and infirmiry receipts for their financial support. Consequently, half the students admitted are totally unfit to enter a profession, not having the proper qualifications and caring for little but to get their diplomas. And when graduated it is safe to say no member of the faculty would think of allowing his family or anyone in whom he was much interested to fall into their hands for service.

This is a brief description of the conditions existing in most of the colleges in the Faculties' Association, yet individuals connected with this organization retort when criticised, saying how much they have advanced the standing of the dental profession, improved the facilities for teaching, and made a three years' course necessary instead of two, etc. All this would be well and beneficial if they had the proper kind of material to work with, but with students who are totally unfit in the classes, the sin is greater because another wrong is done to the incompetent ones, since another fee is taken from them and they waste their time and money for another year.

A great injury is also done those who patronize the college infirmaries and pay for the kind of service which must be rendered by such students. In spite of all this, when any suggestion or criticism is offered these same colleges insist that no one except themselves is competent to judge of their doings or of their graduates.

The National Association of Dental Examiners should be so composed and organized as to render great service in abating the evil, but for various reasons it has not as yet been able to accomplish what is needed. In the meantime the Faculties' Association with a great amount of self-praise adopts resolutions of reform as to qualifications for admission, which it was said would head off the examiners. But when taking a broad view of what reforms are needed, a perusal of these resolutions merely shows how utterly inadequate

they are. Therefore, we make this prediction, that if the colleges do not the profession will stop this abuse; and if the Examiners' Association is not competent by reason of "political appointment" or any other cause, the National Dental Association must step in and take the matter in hand.

That a change must soon be brought about is evident, and it is important that the matter be well considered. It seems to us that a reform must come from some educational institutions, either now in existence or to be formed for that purpose. Who will take the initiative by admitting only students who are qualified to practice this profession? Surely such institutions would receive the support and influence of the leading men of the profession.

### Book Reviews.

**ANATOMY AND HISTOLOGY OF THE MOUTH AND TEETH.** By I. Norman Broomell, D.D.S., Professor of Dental Anatomy, Dental Histology, and Prosthetic Technics in the Pennsylvania College of Dental Surgery, Philadelphia. Published by P. Blackiston's Son & Co., 1012 Walnut St., Philadelphia. Price \$4.50. With 284 illustrations, 1898.

This is a remarkably timely and valuable publication. The growth and appearance of this work has been of especial interest, for seldom has there been a book presented to the dental profession which contains so much of vital interest to every medical practitioner.

It is rarely indeed that a book so replete with original matter can find a publisher who is willing to risk the outlay essential to the proper presentation of ideas which need to be carefully studied in order to be fully understood and appreciated. This publication in its manufacture certainly does great credit to those who have had the care and preparation of illustrations, paper and printing, for they are certainly all worthy of the text, and to say this is high commendation. Of the 284 illustrations a large proportion are original, and those which are duplicates of previous publications are described in detail with such novelty and clearness as to class them with the original work.

In chapters I, II and III, where the osseous and muscular structures of the mouth are under consideration, never before has

such effort been made for the student's benefit as is illustrated in the detailed description of each particular part or tissue; indeed, nothing has been left undone that could add to the ease of the learner in acquiring a knowledge of the parts studied. In the following five chapters devoted to a description of the deciduous and permanent teeth, the same care, accuracy and minuteness of detail are observed as in the previous chapters, so that the individuality of the tooth, as well as its morphology, can be readily acquired, while the great care in selection of illustrations makes the study of the blood and nerve supply of the teeth a pleasant pastime for the ordinary student. The gums, mucous membrane, alveolo-dental periosteum, glands, ducts, etc., all receive their deserved attention.

Of chapter XII, pages 281-323, nothing is risked in stating that nearly all the illustrations are original. In this we have the result of months of painstaking work and careful and close observation. Never before have the tooth follicles been opened, and tooth-sacs and germs, calcified and non-calcified, of the deciduous and permanent teeth been lifted bodily from their moorings and exposed to view. It is impossible to appreciate the care essential to this work unless one has attempted to perform it. If the author had done nothing more than is embraced in this chapter, he would have earned the gratitude of every dental student and given the profession a book of incalculable value for the knowledge so beautifully illustrated herein.

In the twelfth chapter lies the especial value of the work to the medical practitioner, and such instruction cannot be received in a medical school, for no one but a specialist in this science could have the patience to perform the work.

The five chapters under histology which close the labors of the author are noteworthy for the beautiful illustrations and accompanying description of each, which so greatly enhances the student's interest in the study of an intricate subject.

The many dental histologists who have attempted to give us the origin, evolution, morphology and function of the tooth tissues have not had an easy task. The present effort not only gives us a consensus of some of the previous writers' views, but adds Dr. Broomell's own experience in microscopy to what has previously been written, thereby making an ideal book for the dental student and the practitioner as well.

C. N. PEIRCE.

## Notices.

### SOUTHERN KANSAS DENTAL ASSOCIATION.

The annual meeting of the Southern Kansas Dental Association will be held in Wichita, December 27-29, 1898, and the profession in this and neighboring states are cordially invited to be present. U. S. HOUGLAND, Sec'y.

### EASTERN IOWA DENTAL SOCIETY.

The tenth annual convention of this society adjourned Nov. 16, 1898, after a well attended and profitable session. The officers elected for 1899 are: President, R. S. Bandy, Tipton; Vice-President, I. S. Mahan, LaPorte City; Secretary, T. A. Gormley, Mt. Vernon; Treasurer, J. B. Pherrin, Central City.

### SOUTHWEST IOWA DENTAL ASSOCIATION.

At the meeting of this association held in Creston, Iowa, October 18 and 19, the following officers were elected for the ensuing year: President, M. F. Stever, Creston; Vice-President, J. W. Manker, Red Oak; Secretary, F. S. Schadel, Red Oak; Treasurer, S. Cranton, Corning. The next meeting will be held in Corning, June, 1899.

### NEW HAMPSHIRE STATE DENTAL ASSOCIATION.

One of the most successful meetings in the history of this society was held November 1-3, 1898. The following officers were elected for the ensuing year: President, F. H. Brown, Lebanon; Vice-President, C. L. True, Tilton; Secretary, F. F. Fisher, Manchester; Treasurer, G. A. Young, Concord; Librarian, H. S. Mackey, Conway. Executive Committee, L. S. Moulton, Concord; E. F. Bibber, Newmarket; W. F. Slack, Northwood.

### NATIONAL SCHOOL OF DENTAL TECHNICS.

The annual meeting of this organization will be held December 28 and 29, 1898, in the club rooms of the Grand Hotel, Cincinnati, Ohio. The meeting will be opened with the address of Dr. G. V. Black, and the partial program is as follows: "Value of a Graded School of Study in Uniformity among Dental Schools," reports of Syllabi Committees; "Operative Technics," by T. E. Weeks; "Prosthetic Technics," by N. S. Hoff; Symposium of teaching methods, W. H. Whitslar, C. M. Wright and H. H. Burchard; "Steel Technics," by G. H. Wilson; "Teaching Cavity Preparation," by C. N. Johnson. Master of Exhibits, Grant Molyneaux. Discussion of the papers will be opened by prominent instructors, and it is hoped that all interested in the newer methods of teaching in dental schools will be present. A profitable time is promised, and the exhibits of class work will be interesting. The profession is cordially invited to attend.

D. M. CATTELL, Sec'y and Treas., Stewart Bldg., Chicago.

## NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society will celebrate its thirty-first anniversary on Tuesday, January 17, 1899. On this occasion the society will hold an afternoon and evening meeting, and Dr. J. Leon Williams of London will read a paper at each session. Afternoon paper, "On Certain Controversial Questions and Unsolved Problems in Dental Histology and Pathology." A criticism of the recent paper on the structure of enamel, by Dr. Otto Waldkoff. Further researches on enamel structure, with a critical review of the paper on tubular enamels, recently presented before The Royal Society of Great Britain, by Mr. Chas. S. Tomes, F.R.S. An examination of the forms of acid-forming bacteria found attached to the approximal surfaces of the teeth. A brief review of the work of Dr. Filandro Vicentini on the fructification of *leptothrix buccalis*, illustrated by numerous photographs.

Evening paper, "Which Shall It Be, the Scientific or the Empirical Method?" An examination of the present scientific status of the dental profession of America, as shown by its recent literature. The results not altogether flattering. Indifference towards scientific research. The empirical spirit and method. The scientific spirit and method. Are we to have a trade or profession? The question not yet decided. The duty of the colleges. The duty of the societies. The duty of the individuals. The question of patents and secret preparations. The French Academy of Medicine. A plea for the formation of a new national organization, with an established fund and state branches, whose function it shall be to promote original research, and all scientific work connected with the profession, and to examine and pass judgment upon all inventions, formulæ for remedies, etc. Such an organization, if properly formed and managed, is certain to prove a wonderful stimulus to progress in all directions, and at a single blow to destroy quack remedies and useless inventions. An advance of twenty years at a single step. The unification of the state laws regulating practice. Shall we go forward or backward? The executive committee: B. C. NASH, F. T. VANWOERT. W. W. WALKER, Chm., 58 West 50th st., New York City.

## LATEST DENTAL PATENTS.

- 612,081. Spraying device, Russell B. Williamson, Clifton Springs, N. Y.
- 612,106. Pasteurizing apparatus, Adelbert D. Hill, Stanton, Minn.
- 612,158. Continuous hot-air syringe and vaporizer, Martin L. Cooper, Modesto, Cal.
- 612,295. Inhaler, Marvin E. Woodling, Minneapolis.
- 612,590. Dental engine, Albert E. Macdonald, San Francisco.
- 612,655. Dental fountain cuspidor, Wm. N. Avery, San Jose, Cal., assignor to S. S. White Dental Mfg. Co., Philadelphia.
- 612,659. Fountain spittoon, Arthur W. Browne, New York City, assignor to S. S. White Dental Mfg. Co., Philadelphia.
- 612,660. Head-rest for dental chair, Arthur W. Browne, New York City, assignor to S. S. White Dental Mfg. Co., Philadelphia.
- 612,724. Thermal dilator, Jonathan R. Hamilton, assignor to C. S. Emery and A. J. Marks, Toledo, O.

- 612,760. Surgical chair, Edward J. Wells, assignor to Taylor-Wells Co., Morristown, Tenn.
- 613,190. Clinical thermometer, Frank Cossor, assignor to S. Maw, Son and Thompson, London, England.
- 613,232. Atomizer, Charles M. Blackman, New York City.
- 613,413. Atomizer, Argo M. Foster, Cleveland.
- 613,711. Mold for artificial teeth, Alfred Page and S. S. Bloom, Philadelphia.
- 613,772. Dental articulator, John W. Moffitt, Philadelphia.
- 613,842. Bracket attachment for dental chairs, John A. W. Lundborg, San Francisco.
- 613,903. Dental engine, Martin H. Hopper, Minden, Neb.
- 613,905. Sprayer, Leonard Knetzger, Du Quoin, Ill.
- 613,947. Dental matrix retainer, Joseph M. Strout, Portland, Me.
- DESIGN.
- 29,560. Handle for dental pluggers, George E. Greene, Gardner, Mass.

## News Summary.

DR. CLARENCE L. BISBEE, a dentist of Brooklyn, died Nov. 10.

DR. CHAS. GOLLER had his eye blown out Nov. 16, by the explosion of a vulcanizer, and died from the injury.

DR. B. F. JACOBY, a wealthy retired dentist, died suddenly of heart disease Nov. 5, 1898, aged 60 years.

DR. T. M. McDONALD, a dentist of Hamilton, Mo., died Nov. 3, 1898, of typhoid fever. He graduated from a Kansas City dental college in 1897.

DR. WM. P. SENSIBAUGH, a dentist of Port Byron, Ill., is in a serious physical condition as the result of pranks played upon him while being initiated into a fraternal insurance lodge.

FINED FOR VIOLATING LAW.—A. O. Oberlin pleaded guilty to the illegal practice of dentistry, having failed to comply with the state law. He was fined \$40 in Beloit, Wis., Nov. 1, 1898.

CANCER ORIS.—This is now fortunately a rarely seen form of gangrene. In its treatment fuming nitric acid was found superior to carbolic from the outset — *MacMasters, Australasian Medical Gazette*.

RUBBER CEMENTS.—(1) Gutta-percha, 2; caoutchouc, 4; fish glue, 1; carbon disulphid, 26. (2) Dissolve caoutchouc, 9, in chloroform, 60, and add powdered mastic, 15.—*Zeit. d. allg. oest. Apoth. Ver.*, lii., 442.

ELECTRIC SHOCK.—This must be treated as promptly as possible, and not only with artificial respiration, but with faradization of respiratory nerves, phrenicus, vagus and spinal nerves.—*Munich Med. Woch.*, July 19.

NO DISCRIMINATION AGAINST GRADUATES.—The Senate has recently passed a resolution preventing discrimination against graduates of legally chartered medical colleges in appointments to the medical calls of army, navy and marine hospital service.

**CHICAGOANS GRIT THEIR TEETH.**—A Chicago dentist says that the people of this city wear their teeth out by grinding them, through nervousness and the intense mental strain under which inhabitants of this busy city labor.

**DR. CASS BABCOCK**, for many years one of the prominent dentists of Milwaukee, died Oct. 4, 1898, in New York State. He was a brother of Dr. Charles Babcock, of Milwaukee, and had been associated with Dr. Holbrook.

**THE LATEST IN PATENTS.**—A Brazilian has patented an artificial tooth which is hollow, and has a valve in one side through which the air is exhausted to cause the tooth to grip the jaw, after the tooth has been fitted to the gum.

**TEETH OF CANADIAN CHILDREN.**—The trustees of the public school board at their November meeting discussed the poor teeth of pupils and proper remedies for the same. Immediate action was thought to be necessary and some steps will be taken at once to better the existing conditions.

**IN REMOVING PLASTER** from the hands after the application of plaster casts, it would be well to remember the fact that syrup of lime is the strongest solution, and that the application of a little sugar to the hands will greatly assist you. The same rule applies to the removal of casts.—*Ga. Jour. of Med. and Sur.*

**LARD AN ANTIDOTE TO STRYCHNIN.**—Dr. W. D. Turner relates some original experiments, proving that common lard is a perfect antidote to strychnin. He gives the lard freely by the mouth—ten to twenty ounces. He finds it marvelously effective, even when administered after the convulsions have begun.—*Virginia Medical Semi-Monthly*,

**USE FOR MICROBES.**—A German dentist, Dr. Herz, proposes to put microbes into our mouths. His discovery consists of an inoculant prepared from microbes he cultivates for the purpose. When applied to a decayed tooth it stops the pain, but does not devitalize the pulp; furthermore, it makes it possible to put in a permanent filling—so he says.

**GOULD'S POCKET PRONOUNCING MEDICAL DICTIONARY.**—We have received the latest copy of this little book and find it much improved in every respect. The 21,000 most common medical terms are specially defined and pronounced, and the book will be found very convenient to physicians and students. Price, \$1.00. P. Blakiston's Son & Co., Publishers, Philadelphia.

**ALBUMEN** artificially made out of certain coal-tar waste products has been discovered by Dr. Lilienfeld, of Vienna. He claims that it has all the properties of peptone, and that by means of it one can obtain albumen in sufficient quantity to support life at an expenditure of about eight cents a day. It occurs in the form of a brown powder and has a taste resembling egg-albumen.

**TRANSPLANTATION OF STENSON'S DUCT.**—In a case of recurring fistula Goris opened up the duct from the starting point to its termination in the mouth, which he detached from all adhesences, excising all the surrounding connecting tissue. He then fastened it with a couple of stitches behind its natural location; endermic suture of the cutaneous incision. Recovery was prompt and by first intention.—*Presse Med.*, Sept. 3.

**DEATH FROM GERMS IN COTTON.**—Death caused by blood-poisoning from germs in cotton placed to stop hemorrhage in a wound made by the removal of teeth, is held, in *Kasten vs. Interstate Casualty Company*, 40 Wis. L.R.A., 651, to be within a condition of an accident policy denying liability for injuries resulting "wholly or in part from poison or anything accidentally or otherwise taken, administered, absorbed or inhaled."

**DR. S. L. EDWARDS**, a well-known dentist of Des Moines, Iowa, died Nov. 5, 1898, aged 71 years. He was born in Brattleboro, Vt. March 13, 1837, and after completing his college course began the study of dentistry in 1858, and soon after took up the practice of the profession which he followed until a short time before his death. He was a charter member of the Illinois State Dental Society and a prominent member of his own state society, and while of a retiring disposition, was always looking to the betterment of his profession and society in general.

**DR. S. B. BARTHOLEMEW**, a well-known dentist of Springfield, Mass., died Nov. 11, aged 70 years, from Bright's disease. He was born near Hamilton, N. Y., in September, 1828, and was educated at Colgate University. He practiced dentistry in Rhode Island, served as captain in a regiment during the civil war, and edited the *Worcester Gazette* for some years after the war. In 1872 he came to Springfield and practiced his profession until three years ago, when he retired. He was active in public and professional work and at one time a lecturer at the Baltimore Dental College.

**HEMOSTASIS WITH GELATIN.**—All the inconveniences of tampons and the dangers of renewing the hemorrhage when they are renewed, after ablation of tumors of the nose, are avoided by dropping a little 1 per cent gelatinized water from a syringe on the pedicle of the tumor after the first severest gush has been arrested by compression. The clot forms almost instantaneously. Every time the blood appears, check it afresh with the gelatin, warning the patient not to blow his nose, and to stay in bed twenty-four hours, and instill gelatinized or oxygenated water every two hours.—*Semaine Med.*, Sept. 14.

**VALUE OF CHLOROFORM.**—Professor Simpson is said to have obtained his first hint about chloroform from Mr. Waldie, a chemist and bookseller at Linlithgow. One day Mr. Waldie happened to have some of the liquid in a saucer when a gentleman entered the shop with a little dog. The chloroform was placed upon the ground to be out of the way, and presently the dog was discovered lying by the side of the saucer unconscious and apparently dead. After a time the dog regained consciousness. Mr. Waldie began to think he had made a discovery, and after some experiments with cats, with the same result, he interviewed Professor Simpson.—*People's Friend*, Eng.

**HOT AIR AS A HEMOSTATIC.**—The jet of hot air from a Hollander apparatus directed upon the bleeding surface of a kidney, liver or severed blood-vessel, will arrest the hemorrhage by the formation of an eschar commencing around the edges and gradually spreading over the entire surface, mechanically checking the flow, in experiments on animals, and Schneider concludes that it would be equally effective on man. The heat is only 39 degrees at 5 mm. from the apparatus, and hence is not sufficient to injure the organ. He

found steam less effective, and less convenient, for several reasons, masking the field of operation, etc.—*Semaine Med.*, Aug. 3.

PROTECTION AFFORDED BY THE ORGANS.—The *Presse Med.* of June 15 contains the report of experiments by H. Roger, who injected 163 rabbits and 16 guinea pigs with various microbes at five different points in the circulation, to study the protection afforded by the liver and other organs. He found that the microbes are always arrested in the first capillary network they encounter and that the liver disposes of the anthrax, staphylococcus aureus and oidii introduced into the portal vein, so that they disappear and none can be found after a brief interval, but the reverse is the case with streptococcus and coli bacillus, which seem to find the liver a favorable soil and flourish in it, producing extensive lesions. The lung opposes a feeble resistance to the anthrax staphylococcus aureus and oidii, but has a marked bactericidal effect on the streptococcus, although not beyond the limit of neutralizing a fatal dose. The kidney disposes of the oidium albicans.

#### INDEX TO ADVERTISEMENTS.

	PAGE		PAGE
American Endoscopic Co.....	42	Hall & Ruckel—Sozodont.....	3
Ames Dr. W. V. B.—Cement.....	16	Hall, Wm. R. & Son—Disks.....	37
Antidolor Mfg. Co.—Anesthetic.....	40	Harvey, G. F. Co.—Ethyl-Chlorid.....	44
Allen, Dr. T. M.—Dental Depot.....	38	Hampton & Co.—Dental Journal.....	36
Baltimore College of Dental Surgery.....	65	Hisey Mfg. Co.—Anesthetic.....	15
Bethel, Dr. L. P.—Dental Journal.....	60	Illinois School of Dentistry.....	66
Birmingham Dental College.....	64	Indiana Dental College.....	59
Blair Fountain Spittoon Co.....	49	Jones, Horace—Specialties.....	36
Burham Electric Co.—Battery.....	47	Lambert Pharmaceutical Co.—Listerine.....	1
Carroll, Dr. H. M.—Retainers.....	44	Lowry, Dr. H. S.—Crowning Outfit.....	46
Chase Com. Plate Co.—Supplies.....	56	Marion-Sims College, Dental Dept.....	64
Canton Surgical and Dental Chair Co.....	40	Magrath, Jas. T. & Co.—Supplies.....	18
Chicago Kindergarten College.....	61	Manhattan Dental Co.—Platinoid.....	41
Chicago College of Dental Surgery.....	66-9	Morgan & Maxfield—Disk Mandrel.....	41
Chicago Dental Specialty Co.—Gas Outfit.....	10	McBair Electric Furnace.....	37
Dentagra Co.—Tooth Paste.....	5	McKesson & Robbins—Vapocain, Cover page 3	
Douthitt, J. F.—Decorations.....	62	Morgan, Hastings & Co.—Gold Foil, etc.....	59
Douhet Dental Mfg. Co.—Vulcanizer.....	14	Meyer, Dr. J. H.—Post-Graduate School.....	11
Dee, Thos. J. & Co.—Refiners.....	53	Munn & Co.—Patents.....	20
Dow Electric Assistant Co.....	51	National Medical Exchange.....	18
Dunn, Dr. E. H.—Fulcrum.....	40	Northwestern University Dental School.....	67
D-tr-it Dental Mfg. Co.—Specialties.....	39	New York College of Dentistry.....	63
Dental Protective Supply Co.—		Nelson Gold Tooth Co.—Specialties.....	15
Scal.....	2	Nelson Gold Tooth Co.—Anesthetic.....	45
Clark Fountain Spittoon.....	48	Ohio College of Dental Surgery.....	59
Cataphoric Outfits.....	6-7	Palisade Mfg. Co.—Borolyptol.....	72
Dental Engine.....	35	Penna. College of Dental Surgery.....	71
Vulcanite Rubbers.....	43	Phillips, Chas. H. Co.—Milk of Magnesia.....	
Fellowship Alloy, .12, .13 and colored insert.....	2		
Dual-Blade Burs.....	23	Pope Mfg. Co.—Bicycles.....	2
Teeth.....	25-34 and back cover	Robertson, Alex. J.—Supplies.....	19
Fellowship Broaches.....	24	Rugg, Frank E.—Nickel Plater.....	36
Lithos Cement.....	53	Russell Electric Mallet Co.....	38
Philadelphia Branch.....	22	Saul, J. A.—Patents.....	38
Electric Engine Wall Bracket.....	21	Schering & Glatz—Eucain.....	50
Repair Work.....	70	Scivaleno Chemical Co.—Cement.....	19
“No. 1” Handpiece.....	6-9	Spencer, M. A. Co.—Gold Roller.....	50
Frink & Young—Crowns.....	4	Spooner, Dr. F. B.—Cotton Trap.....	18
Fairchild Chemical Laboratory—Sanitol.....	5	Union Tooth Co.....	57
Floyd, Dr. E. A.—Teeth.....	19	Vanderbilt University—Dental Dept.....	60
G-rman-American Dental College.....	18	Willson, H. B.—Patents.....	40
Gessw-in, F. W. Co.—Ruby Crystal.....	45	Webster Mfg. Co.—Blow Pipe.....	57
Gilbert, S. E.—Specialties.....	67	Weld, G. W.—Chemico-Metallic Method.....	56
Goodrich, B. F. Co.—Rubber.....	66	Welch, Dr. T. B.—Alloy.....	47
Goldsmith Bros.—Refiners.....	19	Weller Dental Supply Co.....	62
Howard, C. T.—Strips.....	19	Wilcox, A. A., Laboratory—Cement.....	16
Harvard University—Dental Dept.....	60		

# PRESCRIBE LISTERINE

FOR PATIENTS WEARING  
BRIDGE WORK OR DENTURES

AND AS A GENERAL

Antiseptic and Prophylactic Wash  
For the Mouth and Teeth . . .

♦ ♦ ♦

## LISTERINE

---

Is kept in stock by leading dealers in drugs everywhere, but in consequence of the prevalence of the **SUBSTITUTION EVIL** we earnestly request **DENTAL PRACTITIONERS** to **PRESCRIBE LISTERINE IN THE ORIGINAL PACKAGE.**

♦ ♦ ♦

**LISTERINE** is invaluable for the care and preservation of the teeth. It promptly destroys all odors emanating from diseased gums and teeth, and imparts to the mucous surfaces a sense of cleanliness and purification; used after eating acid fruit, etc., it restores the alkaline condition of the mouth necessary for the welfare of the teeth, and employed systematically it will retard decay and tend to keep the teeth and gums in a healthy state. **LISTERINE** is valuable for the purification of artificial dentures and for the treatment of all soreness of the oral cavity resulting from their use. Patients wearing bridge work should constantly employ a **LISTERINE** wash of agreeable strength.

**LISTERINE** is used in various degrees of dilution. One to two ounces of **LISTERINE** to a pint of water will be found sufficiently powerful for the general care of the deciduous teeth of children, whilst a solution composed of one part **LISTERINE** and three parts water will be found of agreeable and thoroughly efficient strength for employment upon the brush and as a daily wash for free use in the oral cavity, in the care and preservation of the permanent teeth.

♦ ♦ ♦

LITERATURE DESCRIPTIVE OF **LISTERINE** MAY BE  
HAD UPON APPLICATION TO THE MANUFACTURERS

**LAMBERT PHARMACAL COMPANY,**  
ST. LOUIS.

# A Weighty Argument

**PRICE :**  
**\$2.00**



The best results in mixing alloy can be obtained only when the correct proportions are secured. ("Fellowship" alloy requires seven grains of mercury to five of alloy.) We therefore offer this little scale, which can also be used for weighing precious metals, drugs, etc.

The arrangement of the pan makes the scale absolutely accurate, and the capacity is  $\frac{1}{2}$  to 24 grains. It is handsomely nickel-plated and very simple in construction.

## Dental Protective Supply Co.

1101 Champlain Building, Chicago.

# “It Is More.”

A prominent dentist of Chicago said this fall to the writer:

*“Your Sozodont surprises me. It is more than a mouth-wash, it is a dentifrice; and furthermore, in certain cases a remedial agent also.”*

Have you thought of Sozodont as a mere dentifrice, possessing no anti-septic and healing properties? If so, permit us to offer proof to the contrary. At the same time, we will, at your command, send you samples of both the liquid Sozodont and Sozodont Powder. Address (mentioning November “Digest”),

## Hall & Ruckel,

215 Washington St.,      Sole Proprietors of Sozodont,  
New York,  
Dec. 1, 1898.      New York and London.

Established 1848

# CROWNS

## FRINK & YOUNG CROWNS

We have now a full line of the most beautiful Crowns on the market.

The porcelains are the celebrated "Rock Teeth," which for beauty in form, translucency, natural appearance and strength have no equal.

The pins we manufacture are of a much improved form, being very strong, and are securely baked into the teeth in our own laboratory.

**We can therefore guarantee them.**

Our tests show them to be very much the strongest crown manufactured.

The great variety in form enables us to meet all cases.

An illustrated list showing the forms, and with distinctive numbers to each, will be forwarded on application.

And the price won't hurt, either.

## FRINK & YOUNG,

612 Masonic Temple,

CHICAGO, U.S.A.

*Dentacura*  
TRADE MARK

A  
SYMBOL  
OF  
QUALITY.

"There is nothing so dear as the inefficient."

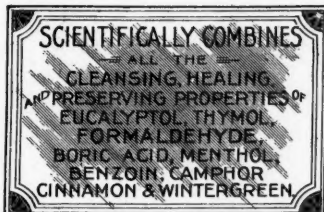
In purchasing a dentifrice the question  
should always be

"How Good?" — never — "How Cheap?"

*TOOTH PASTE*  
TRADE MARK

is not a "cheap" dentifrice, but is the best on  
earth. It stands PRE-EMINENT among  
PROPHYLACTICS.

*Dentacura*  
TRADE MARK



**IT KILLS ALL GERMS,**

Hardens and Polishes the Enamel,  
Prevents Suppuration and Recession,  
Eliminates Inflammation,  
Dissipates Pain,  
Tightens Loosened Teeth,  
Sweetens and Purifies the Breath.

Send for Free Samples, Literature, Etc.

**DENTACURA CO.,** Newark, N. J.

# REDUCTION IN PRICE

OF OUR

## Cataphoric Outfits.

You can't beat these figures.

### The Dental Protective Supply Company's Cataphoric Outfit

For 110 Volts,  
Direct  
Current.



### PRICE, \$15.00 COMPLETE.

By the use of our Cataphoric Outfit, illustrated above, the most sensitive dentin or live pulp can be painlessly removed, or bleaching performed.

The resistance board (A) should be hung on the wall, in a convenient position for operating—the controller (B) being placed either on your bracket, or if preferred in the patient's lap, and can be operated by either one.

By pushing the lever forward on the resistance board to point of first contact, 7 volts are conducted to the controller—by turning handle (D) you increase the voltage from nothing to a maximum of 7 volts by gradations of 1-10 volts.

Should stronger current be required, the handle on controller must FIRST be brought back to zero; the lever (C) can then be pushed forward to point of second contact, when 12 volts will be conducted to controller, and so on to 30 volts. The simple movement of handle (D) will then be all that is necessary.

Size of Resistance Board, 17 in. by  $5\frac{1}{4}$  in. Size of Controller Board,  $9\frac{1}{2}$  in. by  $6\frac{1}{2}$  in.

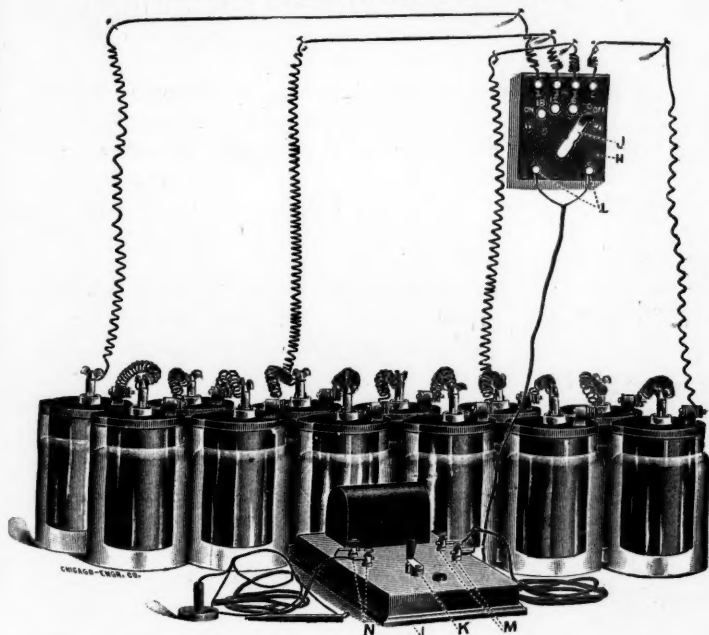
## The Dental Protective Supply Co.

1101-3 CHAMPLAIN BUILDING, CHICAGO.

# Cataphoric Outfit with Battery.

COMPLETE WITH 18 CELLS.

PRICE \$18.00.



CUT SHOWS TWO-THIRDS OF NUMBER OF CELLS.

As there have been a considerable number of inquiries for our Cataphoric Outfit attached to battery, we are pleased to announce that we can now supply the same as illustrated above; space prevents us from showing more than twelve cells in illustration, but the outfit is supplied with **18 cells**, affording a total of about 25 volts.

It will be noticed that 6, 12 or 18 cells can be brought into operation as desired, a most **important improvement** over other battery outfits on the market, and one which the dentist who has to operate on an inflamed pulp, where a **low voltage is absolutely essential**, will quickly appreciate.

The cells should be placed in some convenient closet and wires carried to the switchboard (H), which, with the controller board (I), should be placed within convenient reach of the operator.

The method of operation is exactly similar to that performed with the direct current outfit. Size of Switch Board 4 in. by 4 1/4 in. Size of Controller Board 9 1/4 in. by 6 1/4 in. Size of Battery Cell: Diameter 4 1/4 in., height 7 1/4 in.

FULL DIRECTIONS SENT WITH EACH OUTFIT.

## THE DENTAL PROTECTIVE SUPPLY CO.

1101-3 Champlain Building, Chicago.

# "NO. 1" HANDPIECE

Designed and Manufactured by

## The Dental Protective Supply Co.



A glance at the accompanying cuts illustrating this Handpiece will demonstrate the simplicity of its mechanism.

We have endeavored to design and place before the profession the most simple and durable Handpiece made.

The special features of the Handpiece are the double end chuck, the improved locking device, and long and efficient bearings.

Ample provision has been made for taking up all wear, and we guarantee that if the bearing surfaces are kept clean and well oiled, that this Handpiece will last for years, and prove the best that has ever been placed upon the market.

It is adapted to hold different forms of bit shanks (except cone journal) which can be inserted or taken out from the Handpiece while the engine is in motion; it is also designed so that it can be attached to any Dental Engine, and will fit all ordinary right angle attachments.

Owing to the entire absence of screws the Handpiece can be taken apart without the use of wrench or screw-driver, and is so constructed that escape of oil upon the hand of the operator,—an objectionable feature in some handpieces—is entirely avoided.

In ordering our No. 1 Handpiece, it is essential that you give all necessary particulars as to the style of your engine and attachments

PRICE - - - - \$10.00.

—ORDER DIRECT FROM—

## THE DENTAL PROTECTIVE SUPPLY CO.

### CHICAGO, ILL.

Patented Feb. 5, '95.